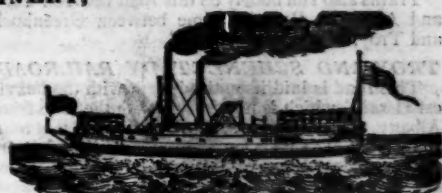


# AMERICAN RAILROAD JOURNAL, AND GENERAL ADVERTISER

FOR RAILROADS, CANALS, STEAMBOATS, MACHINERY,

AND MINES.

ESTABLISHED 1831.



PUBLISHED WEEKLY, AT No. 105 CHESTNUT STREET, PHILADELPHIA, AT FIVE DOLLARS PER ANNUM.

SECOND QUARTO SERIES, VOL. II., No. 51

SATURDAY, DECEMBER 19, 1846.

[WHOLE No. 548, VOL. XIX.]

**REMOVAL.**—It is respectfully requested that all letters, exchange papers and periodicals, for the RAILROAD JOURNAL, may be sent to PHILADELPHIA, as the Journal will hereafter be published there, and the office will be kept at the FRANKLIN HOUSE, No. 105 Chestnut street.

It has required more time than we anticipated to effect the removal and arrangement of our office, consequently this number is somewhat delayed, but we hope to get arranged and up to time soon.

Those subscribers who are about remitting the amount due on their subscription up to the close of the present year, will please address their letters directly to PHILADELPHIA, instead of New York, and much oblige the proprietor and editor,

D. K. MINOR.

**BOSTON AND PROVIDENCE RAILROAD.** Passenger Notice. Summer Arrangement. On and after Monday, Sept. 28, 1846, the Passenger Trains will run as follows:

For New York—Night Line, via Stonington. Leaves Boston every day, but Sunday, at 5 p.m. Accommodation Trains, leave Boston at 7½ a.m. and 3½ p.m., and Providence at 8 a.m. and 3½ p.m. Dedham trains, leave Boston at 9 a.m.; 3 p.m., 5½ p.m., and 10½ p.m. Leave Dedham at 8 a.m. and 4½ and 9 p.m.

Stoughton trains, leave Boston at 11½ a.m. and 4:10 p.m. Leave Stoughton at 8 a.m. and 2½ p.m. All baggage at the risk of the owners thereof.

W. RAYMOND LEE, Sup't.

**BRANCH RAILROAD and STAGES CONNECTING** with the Boston and Providence Railroad.

Stages connect with the Accommodation trains at the Foxboro' Station, to and from Woonsocket. At the Seekonk Station, to and from Lonsdale, R. I. via Pawtucket. At the Sharon Station, to and from Walpole, Mass. And at Dedham Village Station, to and from Medford, via Medway, Mass. At Providence, to and from Bristol, via Warren, R. I.—Taunton, New Bedford and Fall River cars run in connection with the accommodation trains.

**BOSTON AND MAINE RAILROAD.** Upper Route, Boston to Portland via, Reading,

Andover, Haverhill, Exeter, Dover, Great Falls, South & North Berwick, Wells, Kennebunk and Saco.

Winter Arrangement, 1846-7.

On and after October 5th, 1846, Passenger Trains will leave daily, (Sundays excepted,) as follows:

Boston for Portland at 7½ a.m. and 2½ p.m. Boston for Great Falls at 7½ a.m.; 2½ and 3-25

p.m. Boston for Haverhill at 7½ and 11½ a.m., 2½, 3-25 and 5 p.m.

Boston for Reading at 7½, and 11½ a.m., 2½, 3-25 and 6½ p.m.

Portland for Boston at 7½ a.m., and 3 p.m. Great Falls for Boston at 6½ and 9½ a.m., and 4½

p.m. Haverhill for Boston at 7½, 8½, and 11 a.m. and 3 and 6½ p.m.

Reading for Boston at 7, 8½ and 9½ a.m., 12 m., 1½, 4 and 7½ p.m.

The Depot in Boston is on Haymarket Square. Passengers are not allowed to carry Baggage above \$50 in value, and that personal Baggage, unless notice is given, and an extra amount paid, at the rate of the price of a Ticket for every \$500

additional value.

1y31 CHAS. MINOT, Sup't.

**THE BEST RAILROAD ROUTE TO THE** Lake and Buffalo, from Cincinnati.

Take Cars to Xenia, 65 miles; take Stage to Mansfield, 88 miles; thence by Cars to Sandusky, 56 miles to the Lake; thence Steamboat to Buffalo, 230 miles.

Fare from Cincinnati to Sandusky ..... \$8 00

" " Sandusky to Buffalo, Cabin ..... 6 00

" " " " " Steerage ..... 4 50

Fare by this route, although the cheapest across the state, will be reduced in a short time, railroad lengthened, and speed increased.

Leave Cincinnati in the morning, arrive at Columbus at night.

Leave Columbus in the morning, arrive at Sandusky same day.

Leave Sandusky, by Boat, in the morning, arrive at Buffalo next morning in time for the Cars north and east for Niagara Falls, Canada, Saratoga Springs, Troy, Albany, Boston, New York, Washington, or Philadelphia.

Passengers should not omit to pay their fare through from Cincinnati to Sandusky, or from Columbus to Sandusky via Mansfield; as this route is the only one that secures 56 miles [this road is run over in 2h. 50m.] most railroad which is new, and is the shortest, cheapest and most expeditious across the state.

Fares on the New York railroads are about to be reduced.

B. HIGGINS, Sup't, etc. Sandusky, Ohio. M. & S. C. R. R. Co.

**SUMMER ARRANGEMENT.—NEW YORK AND ERIE RAILROAD LINE,** from April 1st until further notice, will

run daily (Sundays excepted) between the city of New York and Middletown, Goshen, and intermediate places, as follows:

FOR PASSENGERS—

Leave New York at 7 A. M. and 4 P. M.

" Middletown at 6½ A. M. and 5½ P. M.

FARE REDUCED TO \$1 25 to Middletown—way in proportion. Breakfast, supper and berths can be had on the steamboat.

FOR FREIGHT—

Leave New York at 5 P. M.

" Middletown at 12 M.

The names of the consignee and of the station where to be left, must be distinctly marked upon each article shipped. Freight not received after 5 P. M. in New York.

Apply to J. F. Clarkson, agent, at office corner of Duane and West sts. H. C. SEYMOUR, Sup't. March 25th, 1846.

Stages run daily from Middletown, on the arrival of the afternoon train, to Milford, Carbondale, Honesdale, Montrose, Towanda, Owego, and West; also to Monticello, Windsor, Binghamton, Ithaca, etc., etc. Agent on board. 13 ut

**NORWICH AND WORCESTER RAILROAD.** Summer Arrangement, commencing

Monday, April 6, 1846.

Accommodation Trains, daily, except Sunday. Leave Norwich, at 6 a.m., and 4½

p.m. Leave Worcester, at 10 a.m., and 4½ p.m.

The morning Accommodation Trains from Norwich, and from Worcester, connect with the trains of the Boston, and Worcester and Western railroads each way.

The Evening Accommodation Train from Worcester connects with the 1½ p.m. train from Boston.

New York Train via Long Island Railroad: Leave Allyn's Point for Boston, about 1 p.m., daily, except Sunday.

Leave Worcester for New York, about 10 a.m., stopping at Webster, Danielsonville, and Norwich.

New York Train via Steamboat—Leave Norwich for Boston, every morning, except Monday, on the arrival of the steamboat from New York, stopping at Norwich and Danielsonville.

Leave Worcester for New York, upon the arrival of the train from Boston, at about 4½ p.m., daily, except Sunday, stopping at Webster, Danielsonville and Norwich.

Freight Trains daily each way, except Sunday.—Special contracts will be made for cargoes, or large quantities of freight, on application to the superintendent.

Fares are Less when paid for Tickets than when paid in the Cars.

33 ly J. W. STOWELL, Sup't.





**CENTRAL AND MACON AND WESTERN RAILROADS, Ga.—These Roads with the Western and Atlantic Railroad**

of the State of Georgia, form a continuous line from Savannah to Oothcaloga, Ga., of 371 miles, viz:

Savannah to Macon—Central Railroad ..... 190  
Macon to Atlanta—Macon and Western ..... 101  
Atlanta to Oothcaloga—Western and Atlantic ..... 80  
Goods will be carried from Savannah to Atlanta and Oothcaloga, at the following rates, viz:

	To Atlanta.	To Oothcaloga.
On Weight Goods—Sugar, Coffee, Liquor, Bagging, Rope, Butter, Cheese, Tobacco, Leather, Hides, Cotton Yarns, Copper, Tin, Bar & Sheet Iron, Hollow Ware & Castings.....	\$0 50	\$0 75
Flour, Rice, Bacon in Casks or boxes, Pork, Beef, Fish, Lard, Tallow, Beeswax, Mill Gearing, Pig Iron and Grind Stones.....	0 50	0 62½
On Measurement Goods—Boxes of Hats, Bonnets and Furniture, per cubic foot.....	0 20	0 26
Boxes and Bales of Dry Goods, Saddlery, Glass, Paints, Drugs and Confectionary, per cubic foot.....	0 30	0 35
Crockery, per cubic foot.....	0 15	" 35
Molasses and Oil, per hbl., (smaller casks in proportion).	9 00	12 50
Ploughs, (large,) Cultivators, Corn Shellers, and Straw Cutters, each.....	1 25	1 50
Ploughs, (small,) and Wheelbarrows.....	0 80	1 05
Salt, per Liverpool Sack.....	0 70	0 95

Passage—Savannah to Atlanta, \$10; Children, under 12 years of age, half price, Savannah to Macon, \$7.  
Goods consigned to the subscriber will be forwarded free of Commissions.  
Freight may be paid at Savannah, Atlanta or Oothcaloga.

F. WINTER, Forwarding Agent, C. R. R., Savannah, Aug. 15th, 1846.

**GREAT SOUTHERN MAIL LINE! VIA** Washington city, Richmond, Petersburg, Weldon and Charleston, S. C., direct to New Orleans. The only Line which carries the Great Southern Mail, and Twenty-four Hours in advance of Bay Line, leaving Baltimore same day.

Passengers leaving New York at 4½ P.M., Philadelphia at 10 P.M., and Baltimore at 6½ A.M., proceed without delay at any point, by this line, reaching Richmond in eleven, Petersburg in thirteen and a half hours, and Charleston, S. C., in two days from Baltimore.

Fare from Baltimore to Charleston.....\$21 00  
" " " Richmond..... 6 60

For Tickets, or further information, apply at the Southern Ticket Office, adjoining the Washington Railroad Office, Pratt street, Baltimore, to  
STOCTON & FALLS, Agents.

**RAILROAD SCALES.—THE ATTENTION** of Railroad Companies is particularly requested to Ellicott's Scales, made for weighing loaded cars in trains, or singly, they have been the inventors, and the first to make platform scales in the United States; supposing that an experience of 20 years has given a knowledge and superior advantage in the business.

The levers of our scales are made of wrought iron, all the bearers and fulcrums are made of the best cast steel, laid on blocks of granite, extending across the pit, the upper part of the scale only being made of wood. E. Ellicott has made the largest Railroad Scale in the world, its extreme length was one hundred and twenty feet, capable of weighing ten loaded cars at a single draft. It was put on the Mine Hill and Schuylkill Haven Railroad.

We are prepared to make scales of any size to weigh from five pounds to two hundred tons.

ELLIOTT & ABBOTT.  
Factory, 9th street, near Coates, cor. Melon st.  
Office, No. 3 North 5th street,  
Philadelphia, Pa.

**GEORGIA RAILROAD. FROM AUGUSTA TO ATLANTA—171 MILES.**

AND WESTERN AND ATLANTIC RAILROAD FROM ATLANTA TO OOTHCALOGA, 80 MILES.

This Road in connection with the South Carolina Railroad and Western and Atlantic Railroad now forms a continuous line, 388 miles in length, from Charleston to Oothcaloga on the Oostenaula River, in Cass Co., Georgia.

RATES OF FREIGHT.		Between Augusta and Oothcaloga, 250 miles.	Between Charleston and Oothcaloga, 388 miles.
1st class.	Boxes of Hats, Bonnets, and Furniture, per cubic foot.....	\$0 16	\$0 25
2d class.	Boxes and Bales of Dry Goods, Saddlery, Glass, Paints, Drugs and Confectionary, per 100 lbs.	0 90	1 40
3d class.	Sugar, Coffee, Liquor, Bagging, Rope, Cotton Yarns, Tobacco, Leather, Hides, Copper, Tin, Bar and Sheet Iron, Hollow Ware, Castings, Crockery, etc.	0 55	0 75
4th class.	Flour, Rice, Bacon, Pork, Beef, Fish, Lard, Tallow, Beeswax, Feathers, Ginseng, Mill Gearing, Pig Iron, and Grindstones, etc.....	0 37½	0 62½
	Cotton, per 100 lbs.....	0 45	0 65
	Molasses, per hogshead.....	8 50	13 50
	" " barrel.....	2 00	3 25
	Salt per bushel.....	0 17	95
	Salt per Liverpool sack.....		
	Ploughs, Corn Shellers, Cultivators, Straw Cutters, Wheelbarrows....	0 75	1 37

German or other emigrants, in lots of 20 or more, will be carried over the above roads at 2 cents per mile.

Goods consigned to S. C. Railroad Co. will be forwarded free of commissions. Freight may be paid at Augusta, Atlanta, or Oothcaloga.

J. EDGAR THOMSON,  
Ch. Eng. and Gen. Agent.  
Augusta, Sept. 2d, 1846. \*44 1y

**THE WESTERN AND ATLANTIC Railroad.**—This Road is now in operation to Oothcaloga, a distance of 80 miles, and connects daily (Sundays excepted) with the Georgia Railroad.

From Kingston, on this road, there is a tri-weekly line of stages, which leave on the arrival of the cars on Tuesday, Thursday and Saturday, for Warrenton, Huntsville, Decatur and Tusculumbia, Alabama, and Memphis, Tennessee.

On the same days, the stages leave Oothcaloga for Chattanooga, Jasper, Murfreesborough, Knoxville and Nashville, Tennessee.

This is the most expeditious route from the east to any of these places.

CHAS. F. M. GARNETT,  
Chief Engineer.  
Atlanta, Georgia, April 16th, 1846. 1y1

**TO RAILROAD COMPANIES AND MANUFACTURERS** of railroad Machinery. The subscribers have for sale Am. and English bar iron, of all sizes; English blister, cast, shear and spring steel; Juniata rods; car axles, made of double refined iron; sheet and boiler iron, cut to pattern; tiers for locomotive engines, and other railroad carriage wheels, made from common and double refined B. O. iron; the latter a very superior article. The tires are made by Messrs. Baldwin & Whitney, locomotive engine manufacturers of this city. Orders addressed to them, or to us, will be promptly executed.

When the exact diameter of the wheel is stated in the order, a fit to those wheels is guaranteed, saving to the purchaser the expense of turning them out inside.

THOMAS & EDMUND GEORGE,  
E. cor. 12th and Market sts., Philad., Pa.

**LITTLE MIAMI RAILROAD.—OPEN TO SPRINGFIELD—Distance 84 miles—**

connecting at Xenia and Springfield with Messrs. Neil, Moore, & Co's. daily daylight lines of stages going east and north, to Columbus, Zanesville, Wheeling, Cleveland, and Sandusky City, via Urbana, Bellefontaine, Kenton, and the Mad river and lake Erie railroad, or Columbus, Delaware, and the Mansfield and Sandusky City railroad—forming, by these connections, the cheapest and most expeditious route to Buffalo, Niagara Falls, Rochester, Albany, New York, and Boston.

On and after Thursday, August 13, 1846, until further notice, a Passenger train will run as follows: Leave Cincinnati daily at 9 A. M., for Milford, Foster's Crossing, Deerfield, Morrow, Fort Ancient, Freeport, Waynesville, Spring Valley, Xenia, Old Town, Yellow Springs, and Springfield.

Returning, will leave Springfield at 4 hours 35 minutes A. M. A line of Hacks runs in connection with the Cars, between Deerfield and Lebanon.

FARE—From Cincinnati to Lebanon....\$1 00  
" " " Xenia..... 1 50  
" " " Springfield... 2 00  
" " " Columbus... 4 00  
" " " Sandusky city 8 00

The Passenger trains run in connection with Strader & Gorman's line of Mail Packets to Louisville.

Tickets can be procured at the Broadway Hotel, Dennison House, or at the Depot of the Company, on East Front street.

Further information and through tickets for the Stage lines, may be procured at P. Campbell, Agent on Front street, near Broadway.

The company will not be responsible for baggage beyond 50 dollars in value, unless the same is returned to the conductor or agent, and freight paid at of a passage for every \$500 in value over that amount.

The 1½ P. M. train from Cincinnati, and the 9 40 P. M. train from Xenia, will be discontinued on and after Monday, the 10th instant.

A freight train will run daily.  
W. H. CLEMENT, Sup't.

**LAWRENCE'S ROSENDALE HYDRAULIC CEMENT.** This cement is warranted equal to any manufactured in this country, and has been pronounced superior to Francis' "Roman." Its value for Aqueducts, Locks, Bridges, Floods and all Masonry exposed to dampness, is well known, as it sets immediately under water, and increases in solidity for years.

For sale in lots to suit purchasers, in tight paper barrels, by JOHN W. LAWRENCE,  
142 Front street, New York.

Orders for the above will be received and promptly attended to at this office. 32 1y

**CLEVELAND, COLUMBUS AND CINCINNATI Railroad.** In pursuance of a resolution adopted by the Board of Directors, on the 21st October, notice is hereby given, that proposals will be received up to the 1st day of December next, for the Grading, Timbering, Bridges and Culverts on forty miles of the road, commencing at Cleveland. Profiles, Specifications, Terms of Payment, and all other information pertaining to the matter, to be furnished on application at the office of the Company, Merwin Block, Cleveland.

JOHN W. ALLEN, President.  
A. G. LAWRENCE, Secretary.  
Cyrus Williams, Engineer.  
Cleveland, October 23, 1846. 45\*1m

**BACK VOLUMES OF THE RAILROAD JOURNAL** for sale at the office, No. 23 Chambers street

**A. & G. RALSTON & CO., NO. 4** South Front St., Philadelphia, Pa.

Have now on hand, for sale, Railroad iron, viz: 180 tons 2½ x ½ inch Flat Punched Rails, 20 ft. long.  
25 " 2½ x ½ " Flange Iron Rails.  
75 " 1 x ½ " Flat Punched Bars for Drafts in Mines. A full assortment of Railroad Spikes, Boat and Ship Spikes. They are prepared to execute orders for every description of Railroad Iron and Fixtures. 11f

**GEORGE VAIL & CO., SPEEDWELL IRON Works, Morristown, Morris Co., N. J.**—Manufacturers of Railroad Machinery; Wrought Iron Tires, made from the best iron, either hammered or rolled, from 1½ in. to 2½ in thick.—bored and turned outside if required. Railroad Companies wishing to order, will please give the exact inside diameter, or circumference, to which they wish the Tires made, and they may rely upon being served according to order, and also punctually, as a large quantity of the straight bar is kept constantly on hand.—Crank Axles, made from the best refined iron; Straight Axles, for Outside Connection Engines; Wro't. Iron Engine and Truck Frames; Railroad Jack Screws; Railroad Pumping and Sawing Machines, to be driven by the Locomotive; Stationary Steam Engines; Wro't. Iron work for Steamboats, and Shafting of any size; Grist Mill, Saw Mill and Paper Mill Machinery; Mill Gearing and Mill Wright work of all kinds; Steam Saw Mills of simple and economical construction, and very effective Iron and Brass Castings of all descriptions. 1y1

**VALUABLE PROPERTY ON THE MILL Dam For Sale.** A lot of land on Gravelly Point, so called, on the Mill Dam, in Roxbury, fronting on and east of Parker street, containing 68,497 square feet, with the following buildings thereon standing.

Main brick building, 120 feet long, by 46 ft wide, two stories high. A machine shop, 47x43 feet, with large engine, face, screw, and other lathes, suitable to do any kind of work.

Pattern shop, 35x32 ft. with lathes, work benches, Work shop, 86x35 feet, on the same floor with the pattern shop.

Forge shop, 118 feet long by 44 feet wide on the ground floor, with two large water wheels, each 16 feet long, 9 ft diameter, with all the gearing, shafts, drums, pulleys, &c., large and small trip hammers, furnaces, forges, rolling mill, with large balance wheel and a large blowing apparatus for the foundry.

Foundry, at end of main brick building, 60x45½ feet two stories high, with a shed part 45½x20 feet, containing a large air furnace, cupola, crane and corn oven.

Store house—a range of buildings for storage, etc., 200 feet long by 20 wide.

Locomotive shop, adjoining main building, fronting on Parker street, 54x25 feet.

Also—A lot of land on the canal, west side of Parker st., containing 6000 feet, with the following buildings thereon standing:

Boiler house 50 feet long by 30 feet wide, two stories.

Blacksmith shop, 49 feet long by 20 feet wide. For terms, apply to **HENRY ANDREWS**, 48 State st., or to **CURTIS, LEAVENS & CO.**, 106 State st., Boston, or to **A. & G. RALSTON & Co.**, Philadelphia. ja45

**TO RAILROAD COMPANIES AND BUILDERS OF MARINE AND LOCOMOTIVE ENGINES AND BOILERS.**

#### PASCAL IRON WORKS.

##### WELDED WROUGHT IRON TUBES

From 4 inches to ½ in calibre and 2 to 12 feet long, capable of sustaining pressure from 400 to 2500 lbs. per square inch, with Stop Cocks, T, L, and other fixtures to suit, fitting together, with screw joints, suitable for STEAM, WATER, GAS, and for LOCOMOTIVE and other STEAM BOILER FLUES.



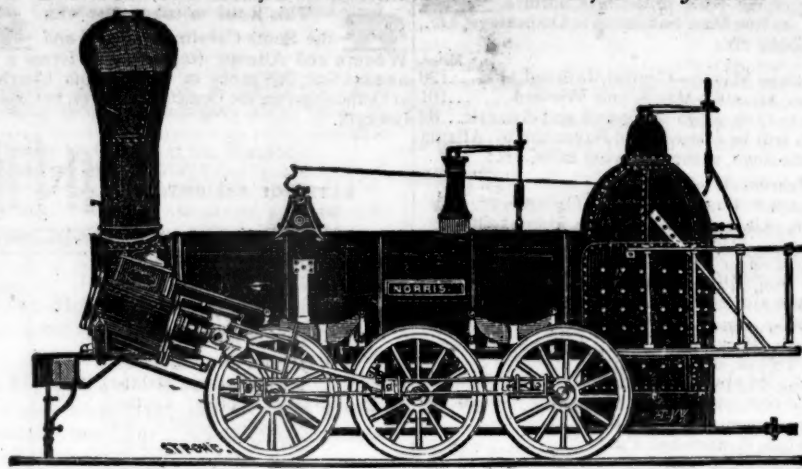
Manufactured and for sale by  
**MORRIS, TASKER & MORRIS.**  
Warehouse S. E. Corner of Third & Walnut Streets,  
**PHILADELPHIA.**

**RAILROAD IRON.—THE NEW JERSEY Iron Company, Boonton, N. J.,** are now preparing to make Railroad Bars, and are ready to take orders or make contracts for Rails, deliverable after the first of December next. Apply to

**FULLER & BROWN, Agent,**  
No. 139 Greenwich, corner of Cedar street.  
September 18, 1846. 1039

## NORRIS' LOCOMOTIVE WORKS.

BUSH HILL, PHILADELPHIA, Pennsylvania.



**MANUFACTURE** their Patent 6 Wheel Combined and 8 Wheel Locomotives of the following descriptions, viz:

Class	1,	15 inches Diameter of Cylinder,	× 20 inches Stroke.
"	2,	14	" " " × 24 " "
"	3,	14½	" " " × 20 " "
"	4,	12½	" " " × 20 " "
"	5,	11½	" " " × 20 " "
"	6,	10½	" " " × 18 " "

With Wheels of any dimensions, with their Patent Arrangement for Variable Expansion. Castings of all kinds made to order: and they call attention to their Chilled Wheels, for the Trucks of Locomotives, Tenders and Cars.

**NORRIS, BROTHERS.**

**THE NEWCASTLE MANUFACTURING Company** continue to furnish at the Works, situated in the town of Newcastle, Del., Locomotive and other steam engines, Jack screws, Wrought iron work and Brass and Iron castings, of all kinds connected with Steamboats, Railroads, etc.; Mill Gearing of every description; Cast wheels (chilled) of any pattern and size, with Axles fitted, also with wrought tires, Springs, Boxes and bolts for Cars; Driving and other wheels for Locomotives.

The works being on an extensive scale, all orders will be executed with promptness and despatch. Communications addressed to Mr. William H. Dobbs, Superintendent, will meet with immediate attention. **ANDREW C. GRAY,** President of the Newcastle Manuf. Co.

**RAILROAD IRON AND LOCOMOTIVE Tyres** imported to order and constantly on hand by **A. & G. RALSTON**  
Mar. 20th 4 South Front St., Philadelphia.

**KEARNEY FIRE BRICK. F. W. BRINLEY,** Manufacturer, Perth Amboy, N. J. Guaranteed equal to any, either domestic or foreign. Any shape or size made to order. Terms, 4 mos. from delivery of brick on board. Refer to

James P. Allaire, } New York.  
Peter Cooper, }  
Murdock, Leavitt & Co. }  
J. Triplett & Son, Richmond, Va.  
J. R. Anderson, Tredegar Iron Works, Richmond, Va.  
J. Patton, Jr. } Philadelphia, Pa.  
Colwell & Co. }  
J. M. L. & W. H. Scovill, Waterbury, Conn.  
N. E. Screw Co. } Providence, R. I.  
Eagle Screw Co. }  
William Parker, Supt. Bost. and Worc. R. R.  
New Jersey Malleable Iron Co., Newark N. J.  
Gardiner, Harrison & Co. Newark, N. J.  
25,000 to 30,000 made weekly. 35



## "Railways at Home and Abroad."

We continue our extracts from the Edinburgh Review on railways at home and abroad, for the purpose of giving a connected view of the railway system in a small compass, by an able writer, who speaks mainly from personal observation.

## THE EDINBURGH REVIEW, AND ITS ARTICLE ON RAILWAYS. (ART. VII.)

(Continued from page 791.)

But on submitting the same train to the same experiment on planes of various acclivities, it was found that each acclivity gave a different uniform velocity of descent. From this followed the consequence, contrary to all that engineers had before taken for granted, that the resistance to the moving power augments in a very high ratio as the speed increases; and that at the usual speed of passenger trains, this resistance is much greater in amount than any estimates which engineers had previously allowed for it.

It was also rendered apparent, that the usual mode of estimating the resistance at so much per ton of the load was altogether fallacious, inasmuch as the same weight of load would offer different resistances to the moving power, according to the number and form of the carriages, and the speed of the motion.\*

On every species of road, the acclivities which are admissible depend on the average resistance offered to the moving power on the level. If this resistance be great, then a considerable ascent will not be felt—the additional resistance which it opposes to the moving power bearing an inconsiderable proportion of the whole amount of resistance which that power must at all times overcome. But if, from the mechanical perfection of the road and the carriages, the resistance habitually opposed to the moving power on the level be very small (as is the consequence of the admirable perfection of railways,) then a very slight acclivity will be sufficient to disable the moving power altogether. It will, therefore, be easily understood, that the degrees of ascent which on a common macadamized road are scarcely felt, are wholly inadmissible on railways worked by locomotive power. The more exquisite perfection of the instrument, the more inconsistent with its efficacy are even slight defects; gaps and inequalities, which would not sensibly impair the excellence of a knife, would entirely destroy the utility of a razor.

Railways must, therefore, be so constructed as to be nearly level. An inclination rising at the rate of one foot in fifty would not be distinguishable from an absolute level, by mere inspection, without the aid of levelling instruments. Yet such an ascent would more than treble the resistance of a railway train moving with the usual speed.

If some mechanical causes forbid a railway to undulate, others render it difficult to wind or to pursue a serpentine course. The necessity for undulation might be avoided, and a general level course preserved, were it

possible to carry it along the trendings of valleys and round the bases of hills. This, however, is rendered impossible, by the mechanical condition of its structure. A railway carriage moves in a groove, or at least, in what is equivalent to a groove. Without some violence to its principle, or some strain upon its structure, it is therefore capable of moving in a straight and direct course. If it has to change its direction, it must be through a curve which bends so slowly and gradually that the part of it occupied at any moment by the carriage shall not sensibly differ from a straight line. The curve, in short, must be one of very large radius; and even in such a curve the carriage can only be forced to turn by the constant pressure of the flanges of the wheels against the outer rail. This difficulty becomes greater as the speed of the motion is increased. A standing rule of railway committees in parliament was, that all curves of less than a mile radius should be matter of special inquiry and report.

Such are among the causes which have rendered the construction of railways expensive, by rendering inevitable vast works to preserve the necessary straightness, and continuous level of the course. As the line cannot descend to the level of valleys and rise over the surface of hills, the former must be filled up and the latter excavated. The road is conducted over the valley on an embankment, and through the hill by means of an excavation. But the valley may be occasionally too deep to render an embankment practicable, or the earth to form it may not be attainable. In this case, the road is raised to a necessary level by a viaduct or bridge, of height or magnitude commensurate to the depth and width of the valley to be crossed. In like manner, the hill may be too lofty to allow a practicable cutting; in which case a hole is bored through it of sufficient calibre to contain the railway, and allow trains to pass through, and it is lined with masonry; a tunnel, in a word, is constructed. When the necessity of such stupendous expedients is duly considered, we shall cease to wonder at the enormous cost of railways.

The system of internal communication by railways now in progress of construction throughout Great Britain, will form, under various points of view, a singular example in the history of public works. Their stupendous magnitude, and the many novel works of art upon them, are scarcely so remarkable as the rapidity of their execution, the amount of capital they have absorbed, and the still more enormous amount of capital they have created. The effects they have produced upon the social and commercial relations of different centres of population and commerce, by augmenting in an unforeseen and incredible ratio the personal communication between them, are not among the least memorable consequences of these undertakings.

We have stated that the first of these series was the Liverpool and Manchester line—thirty miles in length—which was opened for traffic in 1830. In the year 1840, there were thirteen hundred miles of railway in full operation in England, upon which, during

that year, twelve millions of persons had been conveyed. In 1841, fifteen hundred and fifty miles were worked, on which twenty millions of passengers were carried. In 1843, the length of railway opened was eighteen hundred miles, and the number of passengers transported nearly twenty-seven millions; and in 1844, the length was increased to nineteen hundred miles, and the passengers exceeded the incredible number of thirty millions!

Nearly sixty millions of capital had been expended in little more than ten years on these enterprises. But all the principal lines paid large profits. Dividends of ten per cent. were declared, and the shares rose to cent. per cent. premium. The demand for railway shares was enormous; and a supply of corresponding magnitude soon met it. In 1845, three hundred miles of new railway were opened for traffic; and acts were passed by the legislature sanctioning projects in which the construction of a further extent of eighteen hundred miles of railway was undertaken.

Before we proceed to notice the enterprises which remain to be executed, let us examine a little more in detail what has been already effected, and its results.

If we take the principal railways which have been completed and brought into full operation, excluding only a few obviously exceptional ones,\* we shall find that the average amount of capital which they have absorbed is at the rate of £35,000 per mile.—This amount has, in different cases, been distributed in different proportions among the several heads of expenditure; but the following may be taken as near the average distribution:—

Cost of land .....	£4,000
Way and works .....	22,000
Office and sundries .....	1,000
Locomotive power, and working stock .....	8,000

Total ..... £35,000

The railways constructed with the wide gauge were more expensive. An extent of two hundred and forty miles had absorbed £9,704,368, at the close of the last year, being at the rate of above £40,000 per mile.

Such being the cost of construction, let us consider the service rendered to the public, and the revenue produced.

By the returns published by the railway department of the board of trade, it appears that the traffic for the three years ending 30th June, 1845, was as follows:—

Year ending	Miles R way op'd	Rec'd from passengers	Rec'd from goods	Total
June 30, 1843.	1798½	3,110,257	1,424,932	4,535,189
June 30, 1844.	1912½	3,439,294	1,635,380	5,074,674
June 30, 1845.	2118½	3,976,341	2,333,373	6,209,714

Hence we infer the amount of each kind of traffic per mile in each year as follows:

Year	Amount of pass'ger traf- fic per mile.	Annual increase	Amount of goods pr mile	Annual increase	Total	Annual increase
	£	pr cent	£	pr cent	£	pr et.
1843	1729	....	792	....	2521	....
1844	1773	2.55	855	7.90	2628	5.20
1845	1877	5.87	1101	21.34	2978	10.70

\* Such for example as the London and Blackwall, the London and Greenwich, and a few which, on the other hand, have been completed at an exceptionally low rate.

\* For the details of this investigation, see the report of Dr. Lardner in the proceedings of the British Association and the appendix to the same, by Mr. Edward Woods.

It appears, therefore, that there is an annually increasing amount of traffic; that the rate of increase on the goods traffic is even more rapid than the passenger traffic; and that the average annual total amount received per mile in 1845, was £3000, omitting fractions.

The proportion of this gross revenue, absorbed by the current expenses of the transport, is different on different lines. In some it is above 50 per cent; in some below 40 per cent. In 1842 it was estimated at 44 per cent. of the gross revenue; but it is probable that, by improved machinery and increased economy, it is now diminished. It may be taken at present at 42 per cent. of the revenue. Of the £3000 per mile received then, 58 per cent., or £1740 per mile may be taken as the profit on the £35,000 per mile sunk—being at the average rate of 5 per cent.

Thus it appears, that although several great enterprises give 10 per cent., the general average profit on these speculations does not amount to more than the ordinary profit on capital engaged in large commercial investments. Many unsuccessful lines pay little or no interest on the capital sunk, and some yield dividends of comparatively small amount; and thus the larger dividends of the more successful lines are neutralized. The increase of traffic, however, indicated in the above table of annual returns, would render it probable that the annual profits would become larger, unless the further extension of railways should check them.

It will be observed that of the total annual revenue of the railways, 63 per cent. proceeds from passengers, and 37 per cent. from goods.

In estimating the manner in which the railways minister to the public service, the question arises—whether they chiefly serve as means of personal intercourse between those great centres of population and commerce which are usually selected as their *termini*; or whether they, in a greater degree, benefit the population located in those districts of the country through which they pass.—Unquestionably the general impression was, and, so far as we have observed, still is, that the great mass of the traffic is derived from the large cities and towns at their *termini*.—This question has much interest, not merely to the public in general, but to those who engage in railway speculations in particular. Is the population of the country through which a line of railway passes, or the population of its *termini*, to be considered most in calculating its probable success?

We shall arrive at a solution of this problem by comparing the total number of passengers carried on the railway, with the total amount paid by them on the one hand, and the average fare per mile chargeable to them on the other. In the following table we have given the number of passengers in each class, booked in the year ending 30th June, 1845; the total amount of fare they paid; the average paid per passenger; the average fare charged per mile; and the consequent average distance which each passenger travelled. In order to express the actual and relative amounts of passenger service rendered by the

railways in that year, we have also given the equivalent number of passengers of each class and the total carried one mile.

	Number of passengers.	Receipts from passengers.	Receipts from passenger.
		£	s. d.
1st class.....	5,474,163	1,516,805	5 7
2d class.....	14,325,825	1,598,115	2 2
3d class.....	13,125,820	621,903	0 11½
Mixed.....	855,445	200,518	4 11
Total & mean.	33,791,253	3,976,241	2 4

	Average fare per mile for each passenger.	Average distance travelled by each passenger.	Equivalent No. of passengers carried one mile.
	miles.	miles.	
1st class.....	2.6	26.7	142,328,238
2d class.....	1.086	13½	196,263,802
3d class.....	1	11	147,777,975
Mixed.....	2.3	24½	29,530,480
Total & mean.	1.8	16	506,900,695

The results exhibited here suggest several reflections, which must be as interesting to railway proprietors as to the public in general.

In the first place it is apparent, contrary to what might be expected, that the railways derive their revenue from passengers who travel short distances, and not from those who pass between the great centres of population which mark the *termini*, and which usually give the railway its name. The first class passengers, whose excursions are the longest, travel on the average only twenty-six miles; and it must be observed, that the great majority of these travel much less distance even than this. For one who makes a trip of 100 miles, there must be at least ten who go only 10 miles, otherwise the average could not be maintained. In like manner, the second class passengers travel only 13 miles, and the third class 11 miles—giving, say 12 miles, as the mean of the two; and these constitute above 80 per cent of all the passengers transported on railways! Short passenger traffic—that is to say, trips of a dozen miles or thereabouts, these it is evident, constitute the great staple of the railway business in passengers. It is clear, then, that the terminal populations have but little connection with the financial success of railway projects. The main support is short traffic.

Of every one hundred passengers booked, there are the following proportions of the different classes:—

1st Class.....	16½
2d Class.....	43½
3d Class.....	40

Of every hundred pounds of gross revenue, the following proportions are contributed by the different classes:—

1st Class.....	£40 14
2d Class.....	42 16
3d Class.....	16 10

The existence of some unwise discouragement to the third class passengers, is very apparent in these numbers. Under the ordinary influences which govern personal economy, they ought to be the most numerous, if not the most productive. They are, nevertheless, inferior in number to the second class, and produce a revenue greatly inferior to either first or second class. We shall more clearly perceive the cause of this paradox by reference to the traffic elsewhere. In Belgium,

the relative numbers of the different classes is such, that of every 100 passengers there are

1st Class.....	10
2d Class.....	30
3d Class.....	60

And of every £100 gross revenue from passengers, the contribution of the respective classes is

1st Class.....	£20
2d Class.....	33
3d Class.....	47

The revenue of the railways, in England, is therefore chiefly drawn from the first and second class passengers; while that of the Belgian lines is supplied by the second and third class, but chiefly by the latter. The one system contributes to the service of the lower orders of the population, and the other to the middle and higher.

Whether both objects might not be attained, would perhaps be best ascertained by a comparison of the fares. On the English lines, the third class passengers are discouraged by four causes, brought into operation, apparently with that intention by the companies.—These are, 1. high fares; 2. carriages uncomfortable and unsafe; 3. inconvenient hours; 4. slow speed.

The following show the English and Belgian fares in juxtaposition:

	British. 10ths of a penny.	Belgian. 10ths of a penny.
1st Class per head per mile.....	26	14 8-10
2d Class.....	18 6-10	8
3d Class.....	10	6

Thus, while the fare of each class is considerably lower than the corresponding class on the British lines, the third class is little more than half of the third class on our railways; and the carriages for this class are started at all hours, and are protected by roofs from the weather, and from the discharge of the funnel of the engine.

It appears from the numbers in the last column of the above table, that the passenger service rendered by the British railways in 1844-5, was equivalent to five hundred millions of passengers carried one mile!

Let us see what number of ordinary stage coaches could have performed this service in the same time.

One hundred horses working in a coach, would carry 25 passengers per day 100 miles. Omitting fractions, the number carried in the year would be 10,000, which would be equivalent to a million carried one mile. Such a coach, worked by 100 horses, would take five hundred years to execute the passenger traffic of the railways in the year 1844-5. In doing this, it would travel a distance equal to fifteen hundred times the circumference of the globe.

The locomotive engines, therefore, employed in drawing passenger trains in that year, performed the work of 50,000 stage coach horses.

It is worth while to compare the cost at which this has been executed, with that at which the same service would have been performed by stage coaches. In making this comparison, it is necessary to remember that there are three sources of economy, which the railway offers, in comparison with stage



coaches. First, the saving in the fare; secondly, the value of time saved; and thirdly, the saving of *tavern expenses* on the road.

1st. If we take the coach fare on average at fourpence per mile (a low estimate,) the saving by the railway will be at the rate of 2½d. per mile per head.

2d. The saving of time will be at the rate of nine hours, in every hundred miles travelled. For one must allow thirteen and a half hours (at seven and a half miles an hour) for an ordinary stage coach to perform 100 miles, which on the railway would be travelled in less than five hours. If we estimate the time of the class which travel on the average at six shillings per working day of twelve hours, this will be sixpence per hour.

3d. A traveller thirteen hours on the road must take at least one meal at a tavern; many will take two. A traveller four or five hours on the road takes nothing. Let this saving be put down on the average at 2d. per 100 miles. We shall then have the following account of the amount saved by those who travelled on the railways in 1844-5, compared with what travelling the same distance in stage coaches would have cost:

506,900,695 miles at 2½d. per mile, fare saved .....	£5,280,215
45,621,033 hours saved, at 6d. per hour .....	1,140,526
506,900,695 miles, tavern expenses at 2d. per 100 miles .....	506,900
	£6,927,641

The total saving is, therefore, nearly double the sum paid as railway fare. In other words, the locomotive engine has reduced the cost of travelling to one-third of its former amount—even at the rate of fare charged under a system of monopoly, as compared with the open competition of stage coaches.

Let us now turn our attention for a moment from what has been actually accomplished to what is in progress of completion, or projected.

We have seen that, on the 30th June, 1845, 2118 miles of railway were open for traffic. During the year 1845 nearly 300 miles more were completed, and inspected by General Pasley. Besides these, there are many lines which had obtained their acts before January, 1845, of which we have no return. We shall be considerably within the truth if we assume, that the total length of railways for which acts were obtained previous to 1845, was 2500 miles. In the session of 1845, acts were passed authorizing the construction of a further extent of 1793 miles—making a total to December, 1845, of 5300 miles.

In the session which has just terminated, however, it was reserved for the world to witness an extent of speculation, of which history we believe, can produce no similar example. Four thousand miles of additional railways have actually received the sanction of the legislature, which, if completed, will make up the enormous extent of 9300 miles.

The amount of capital of the companies whose acts were passed in 1845, exclusive of loans, was £29,168,640; which, divided among 1793 miles, is at the rate of £16,268 per mile. Now we have shown that the 2000 miles of railway in operation have absorbed capital to the amount of £35,000 per mile;

and it may, therefore, be asked, how nearly an equal length is now to be constructed, at less than half the cost? But there is no mystery in the matter. If we compare the capital originally estimated for any of the principal lines, with their actual cost, we shall find the explanation of this apparent inconsistency. Take the three following lines:

	Orig. capital.	Actual cost of the line
Liverpool and Manchester, ..	£ 510,000	£1,774,000
London and Birmingham, ..	3,500,000	6,000,000
Birmingham and Liverpool, ..	1,000,000	1,500,000

In fact, the estimated capital is not even a tolerable approximation to the cost of a railway.

It is contended that, owing to improved machinery and other causes, railways can be constructed at a less expense now than formerly. In some of the items of expenditure this is true: but others, such as the cost of land, certainly are not changed; and some, such as wages of labor, will certainly be augmented. We shall probably be near the truth if we allow £30,000 per mile, for the lines still to be constructed.

The capital of the companies, which have obtained acts for about 4000 miles of railway, during the last session, amounts to about £150,000,000, exclusive of loans. This is at the rate of £37,500 per mile, which is rather above the average cost of the completed lines.

It appears then, that there are now in progress, and sanctioned by parliament, 5800 miles of railway, to complete which, and bring them into operation, will absorb at least two hundred millions sterling! Most of the companies promise the completion of their enterprizes in three years; but, allowing for engineering casualties, and unforeseen causes of delay, there is no reason to suppose that any of them should exceed five years—assuming, of course, that the necessary capital and labor shall be forthcoming. The annual instalment of capital necessary to accomplish this will, therefore be forty millions.

Such is the sum which must be taken yearly, from the surplus savings of British industry, for the next five years, if these projects are to be realized. There is no escape from this astounding inference. We say nothing of the amount of British capital promised to foreign railways, which, however, is not inconsiderable. Those who are best acquainted with the public finances, and the laws which regulate money and labor, regard the consequences of such a yearly demand with serious apprehension. If it were possible to ascertain the average net savings of the country, and to estimate the proportion of these which could, without injury, be withdrawn from other undertakings which are in a growing state, the effect of these prospective operations might to some extent be foreseen. But, as it is, all is left to conjecture. It is, however, past all doubt that a serious pressure on the money market must take place, and which must produce great loss and inconvenience to the manufacturing and trading interests; and as a concomitant effect, the unusual demand temporarily created and then suddenly relaxed, must occasion very

injurious arrangements in the market for labor.

To be continued.

# Experiments on Wrought Iron Hollow Beams for Railway Bridges.

The following illustrations of experiments made by Messrs. Fairbairn & Hodgkinson, will be interesting, and we trust useful to our readers. We find them in the Railway Chronicle of November 7th.

The recent investigations carried on for Mr. Stephenson by Messrs. Fairbairn & Hodgkinson, for the immediate purpose of affording data for the construction of the Britannia bridge on the Holyhead railway, are likely, in our opinion, to open up collateral investigations of no less practical interest to the railway engineer, and of no less public importance to the railway proprietary, than the immediate object of the construction of the bridge itself, however interesting and important. We have seen wrought iron tubes made of boiler plates riveted together, so as to form beams of rectangular section, some 3 feet deep by 9 inches wide and 30 feet long, employed with great success for the last six or seven years, and forming bridges which carry wagons loaded with coal, iron and other minerals. We have often wondered why an arrangement of materials so judicious has not been more generally used, and we imagine the only reason must be the want of acquaintance with the material, or rather the best mode of applying it. Similar uses of wrought iron plates are common in the construction of iron ships. It is only to be attributed to our ignorance of the extent to which such beams may be trusted, and of the best mode of disposing of the flexible material, so as to resist the strain, that has deprived us of the use of a mode of constructing bridges which is peculiarly adapted to circumstances where nothing else would do so well, which will often be found economical, as well as convenient for the construction of bridges. Wrought iron girder bridges are likely to be henceforth very frequently employed.

We have therefore deemed it very important to the profession that, as soon as possible they should be put in possession of all the practical data that can be afforded by the investigation so wisely commenced by Mr. Stephenson, and so judiciously conducted by Messrs. Hodgkinson & Fairbairn, whom we may consider, from their great experience in such matters, as the highest authorities extant on the strength of iron. We have therefore engraved the drawings which Mr. Fairbairn had made of the first series of his experiments preparatory to the Britannia bridge experiments, and we give them in order that our railway engineers may, as soon as they find expedient, avail themselves of this knowledge to the purposes of such new lines as they may be about to construct under the new acts of parliament obtained last session. Some of these experiments are made on beams 30 feet long, and some of them carrying as much as ten tons; and therefore they are on so large a scale that no doubt can remain of their immediate practical utility.

The first series were naturally enough made on cylindrical tubes; and it deserves notice that the difficulty in tubes of this kind,

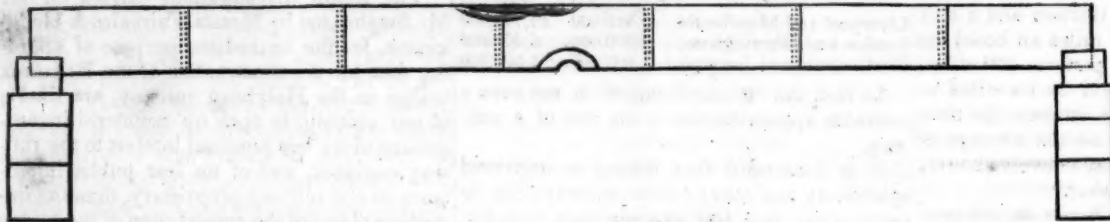
made of very thin metal, lies in preventing the upper side of the loaded tube from crumpling or buckling up by flexure. This happens, it will be seen, in the thinnest tubes, in experiments Nos. 1 and 2, but in the others, where the metal is so thick as to withstand

buckling, much higher results are obtained. The tubes were supported at the ends on block heads, fitted to their shape and loaded with weights suspended from an aperture in the centre. This aperture was of course strengthened, so as to prevent fracture there.

**Series No. 1.—Experiments on Cylindric Beams.—Experiment I.**

Length in the clear, 17 feet.  
Diameter, 12.18 inches.  
Thickness of iron, W.G. No. 20, .3408 of an inch.  
Deflection, .039 of an inch.  
Breaking weight, 3,040 pounds.

Fig. 1. Showing the nature of the fracture.  
Elevation of beam.



Section.



This, as we might have expected from the extreme thinness of the metal in proportion to the diameter of the beam, gave way by buckling on the upper or crushing side. This also was the case in the next experiment.

**Experiment II.**

Length in the clear, 17 feet.  
Diameter, 12 inches.  
Thickness, .0370  
Deflection .65 in.  
Breaking weight, 2,704 pounds.

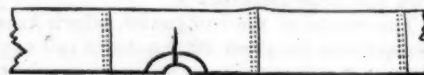
Fig. 2. Showing the fracture.



**Experiment III.**

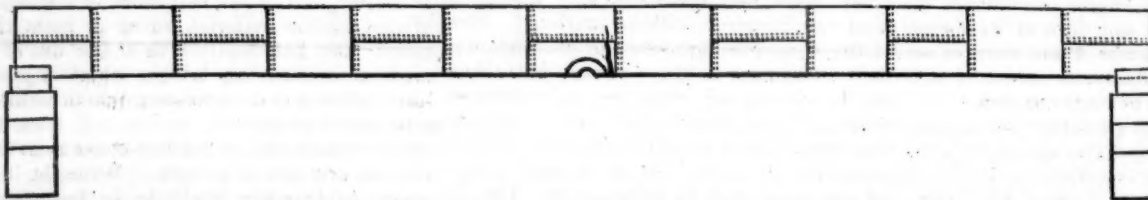
Length in the clear, 15 feet 7 1/4 inches.  
Diameter, 12.40 inches.  
Thickness, .1310 inches.  
Deflection, 1.29 inch.  
Breaking weight, 11,440 pounds.

Fig. 3. Showing the fracture.



Here, then, at the third trial, we have attained the desideratum; the plate is only about one-eighth of an inch thick, it carries 5 tons, and then only parts at the hole, where the breaking weight is suspended.

Fig. 4. Showing the fracture in Experiment IV.  
Elevation of beam.



Section.



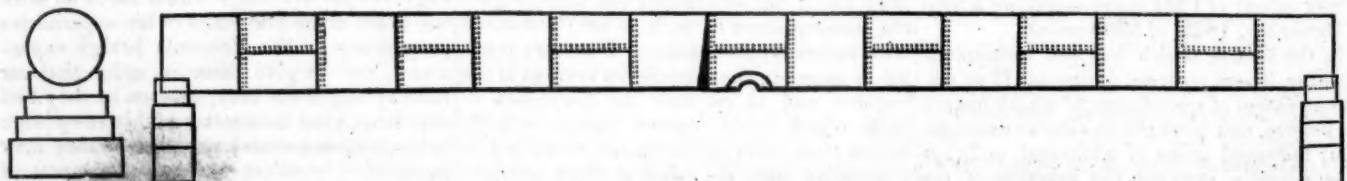
Fig. 5. Showing the fracture in Experiment V.



Fig. 6. Showing the fracture in Experiment VI.



Section.



The next three are the last in this series of cylindric experiments. The diameters of the tubes are increased in the ratio of 3 to 4, and their length in about the same proportion.—These ought to have borne more for equal thicknesses, but they do not. The diameter of the tube seems, therefore, to have been increased beyond the best size for a given span and thickness of plate. It appears to us tolerably probable, as far as these experiments go, that the thickness of the plate should not be less than the one-hundredth part of the diameter of the tube.

Fig. 7. Showing the fracture in Experiment VII.  
Elevation of beam.

**Experiments VII VIII IX.**

Length.	Diameter.	Thick.	Deflec.	Break. wt.
7. 31 ft. 3 1/4 in.	21.00 in.	.0954 in.	.63 in.	9,760 lb.
8. 31 ft. 3 1/4 in.	24.30 in.	.1350 in.	.95 in.	14,240 lb.
9. 31 ft. 3 1/4 in.	24.20 in.	.0954 in.	.74 in.	10,880 lb.

Fig. 8. Showing the fracture in Experiment VIII.



Fig. 9. Showing the fracture in Experiment IX.



It is plain from these last, that the riveting is the weak part, and that the strength depends on that part which is left in the plate between the rivet holes. Double riveting was used in this case, and is undoubtedly the best form for strength.

From these experiments of Mr. Fairbairn we feel disposed to draw the following practical conclusions.

A round beam of malleable iron, a quarter of an inch thick and 18 inches diameter, extending over a span of 24 feet, would not break with 12 tons on the middle, or 24 tons distributed along it. It would probably carry much more. For many cases, however, the cylindric is not the most convenient form. We must defer the consideration of those which are until another occasion.



Correspondents will oblige us by sending in their communications by Tuesday morning at latest.

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### AMERICAN RAILROAD JOURNAL.

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#### Railroad to the Pacific.

MR. WHITNEY's great scheme for a railroad to the Pacific has excited a deep interest throughout the whole western country, if we may judge any thing from the "large and enthusiastic" meetings, which have lately been held in the principal cities there. At Cincinnati, Dayton, Columbus, Indianapolis, Louisville, St. Louis, etc., we perceive that public meetings have been held; and, in a majority of these places, memorials have been got up, addressed to Congress, recommending the grants asked for, (of the public lands,) to carry on the projected railway. The plan is immense, and the means requisite to prosecute the undertaking, are proportionately great. The western community seem well disposed towards this stupendous enterprise.

#### Interesting Investigations.

A late number of the Portland Advertiser contains some extracts from the *London Athenaeum*, in reference to the business of transportation upon railroads, which is of a highly interesting and important character to that interest. The statements made, appear to come from responsible authority, and exhibit some new developments of railroad improvements. The accounts indicate, says the Advertiser, "two or three propositions of great importance."

1st. That the lowest rates for railroad transportation of freight have not yet generally been reached—perhaps not anywhere.

2d. That the roads should be conducted in the best and cheapest manner, with the most watchful regard to all scientific improvements, and managed also with all practicable economy, to enable them to adopt the low rates, demanded by competition with other modes of transportation.

3d. That the location of railroads, where freight is anywise desirable as a source of income, should be such as to give them a fair and reasonable opportunity to succeed in the competition with other conveyance.

4th. That unnecessarily competing lines of railroad should not be encouraged; since the tendency of such competition must be, instead of reducing the rates of transportation for persons or goods, to cause companies to combine against the public, to keep rates up. If the power and capacity of the road cannot be fully employed, then the proprietors will want double pay for half work.

#### Belpre and Cincinnati Railroad.

A meeting of the commissioners in the act to incorporate the "Belpre and Cincinnati Railroad Company," was held at Chillicothe, on the 25th ult. It was unanimously resolved to accept the charter, and a resolution was adopted—as appears in the Chil-

licothe Advertiser—authorising the books of subscription to be opened forthwith at numerous places throughout the state of Ohio. It is believed that the stock will very readily be taken up, and such has been the success of the Springfield road, lately opened in Ohio, that there exists no doubt this route will be prosecuted with energy.

#### Railroad Iron.

The Philadelphia Sentinel says that "two bars of railroad iron manufactured by Messrs. Reeves, Buck & Co., of this city, at their new rolling mills at Phoenixville, are now exhibiting at the Franklin Institute. The workmanship is fully equal to any iron ever exhibited in this city."

Will those gentlemen please send a sample of their iron to the office of the Railroad Journal?—*Ed. R. R. J.*

#### Baltimore and Ohio Railroad.

The Baltimore Patriot speaking of the movements in Philadelphia, in relation to the Pennsylvania railroad, is anxious to push on the Baltimore road to the Ohio river.

"We must go on with the work at once," says the Patriot, "and must carry it wherever the way is open to us. Whether it strikes the Ohio at Pittsburgh, or Wheeling, or Parkersburg, is scarcely to be considered now. The great matter is to reach the Ohio river, and, if unwise legislation or ungenerous rivalry prevail to shut us out from the selection of a route we deem the best, we cannot now stop to dispute with them who thus war against us, by trying to convince them that they are wrong. Time now is more important than even a particular route, and we must readily give up the latter in order to gain the former. We have two ways opened to us. We can go to Wheeling through Virginia, or we can go to Pittsburgh through Pennsylvania. Originally, one or both these routes was contemplated. We can now secure either, and we may even take both. Let there, then, be no longer delay; let it be no longer a matter of doubt whether we shall go here or whether we shall go there. What we have to do is to make the road, and let us set about doing it. If the city of Baltimore is true to herself—if those specially charged with this great work shall fulfil the expectation confidently indulged in regard to them—the year 1846 will not pass away before the line shall be fixed and the ground broken, where the road to the Ohio river is to be made."

#### Railroads.

The Michigan Central railroad has latterly done a very greatly improved trade. A late number of the Detroit Advertiser says an immense business has been accomplished on this road for some time past, and mentions an instance within a few days in which flour and wheat equal to five thousand barrels of flour, were brought to that city by the railroad in a single day.

The subscription to the Pennsylvania road, by the authorities of Philadelphia, is for \$1,500,000. It is made on condition that an equal sum shall be raised by private subscription. Of this latter sum nearly a million has been subscribed, and the Philadelphia North American says it is ascertained that the remaining half million will be obtained without difficulty.

We are pleased to learn that capitalists are awake to the importance of urging on the New York and Boston land route. The Scientific American learns that about \$2,000,000 of the stock of the New York and New Haven road has been taken up already, and that the road is to be completed within one year from the 1st of January next.

The bridge upon the Hartford and Springfield railway, (over the Connecticut river at Windsor Locks,) has been rebuilt, and the cars now pass over it again. It will be recollected that the upper portion of this bridge was severely injured by the storm, some weeks back, which broke up the connection for a time.

Two iron companies in the state of New Jersey have contracted to furnish the Utica and Schenectady railroad association with 6600 tons of new rails, to weigh 65 pounds to the yard. The contract is sufficient for the whole road.

Another section of the Erie railroad, from Middletown to Otisville, has been lately opened for travel, and another section of 11 miles is to be finished early next season, by which time it is expected that contracts will be made for grading 130 miles more.

The friends of the Rutland, Vt., road have been active in their exertions for its advancement, and have announced that the stock has all been subscribed for, and that the road will soon be commenced.

The St. Louis Reveille states that the people of Galena and Chicago are pushing the subject of a railroad between those two western points. When such a project is completed, it will very naturally take from St. Louis much of her upper trade. Lead will take that route to the eastern market, for it can be carried cheaper and with less risk. Grain will go on that route, because it can be carried at less cost, in a shorter period of time to market, and is not as liable to deteriorate in value. The best grain region in the Mississippi valley is that lying above St. Louis, and by this upper communication New York will have secured it to herself. A railroad to Cincinnati from St. Louis might give the trade a direction which would benefit St. Louis.

Germany has now open to public traffic 37 railroads, extending a length of 4694 geographical miles. There are at work on those lines 600 locomotive engines, of which 267 are of English construction, 39 American, 46 Belgian, 16 French, and the remainder German.

The citizens of Dayton, Ohio, in a public meeting on Monday week, appointed committees to correspond with the Mad River company, for information relative to connecting Dayton with Springfield; and with the Little Miami company in relation to connecting Dayton with some point on the road.—Reports from these committees are looked for on the 9th inst., at an adjourned meeting.

The proposals for constructing the first forty miles of the "Cleveland and Columbus railway" have been opened. There are bids from responsible contractors at averages between the estimate, to take pay one-half in city scrip, one-fourth in cash, and one-fourth stock. These terms the company can meet, and the work will be immediately commenced, says the Cincinnati Gazette.

We learn also from the Gazette that the books which were opened for subscription to the stock of the "Hamilton and Dayton" road, were closed on Thursday evening. Only a limited portion of the stock was taken, but sufficient to organize the company under the charter, and to take many of the preliminary steps to the prosecution of such an enterprise. We have not heard how much stock has been taken at Hamilton and Dayton.

It will be perceived by the above items, that the railway interest is growing rapidly in favor with the business community, and it may be safely asserted, that at no time in our country's history has that interest been so extended, as at the present time. This argues well for the enterprise of our citizens in various parts of the country, and we are rejoiced

to notice this rapid advancement in our great internal improvements.

#### Suspension Bridge at Cincinnati.

We find in the Cincinnati papers several notices of the "Report and Plan for a Suspension Bridge across the Ohio River, at Cincinnati—by JOHN A. ROEBLING, Esq., C. E." During the winter of 1845 and 1846, the legislature of Kentucky granted a charter for this enterprise, (so far as that state was concerned,) and a bill was introduced in the Ohio legislature, subsequently, for a similar object. The bridge was proposed to cross the river from the Queen city to Covington, Ky., but the opponents of the bill defeated the measure in Ohio, at its last session, though it is believed that a more favorable result will be attained the present season.

It is contended by those in favor of this project, that immense advantages must accrue from the success of the undertaking, both to the city of Cincinnati and to the state of Kentucky—and it is believed by the friends of this means of communication, that it will prove a profitable investment to the stockholders, and a lasting benefit to the inhabitants on both sides of the river. During the winter season, the communication between the two points are often interrupted, or cut off entirely, for days together, in consequence of the obstructions by ice—and at that season, particularly, immense numbers of cattle and hogs are detained at a heavy expense, upon the Kentucky side, on account of the inability to cross in the ferry boats. A bridge would obviate this evil, and would add materially to the convenience of business men, who have their places of business in Cincinnati, and reside on the Kentucky side. It would have the effect, also, of raising the price of real estate both in Cincinnati and Covington—and its completion would give a new impetus to the business prospects of both places. Covington would be (and at no very distant day, either,) to Cincinnati, what Brooklyn is to New York, or East Boston to the "City of Notions"—and we know of no good reason why this enterprise is not clearly a project most desirable in every respect—whether relating to private or public interests.

The opponents of the proposed bridge, object to its construction principally on the ground that the free navigation of the river would be impeded. This is a very formidable and serious objection, if well founded; but provided it be obviated, and in the event that it shall prove practicable to erect it sufficiently high to do away with this objection—there seems to be no tangible reason, or cause, which should for an instant operate against the early construction of a work which seems so important, in all its bearings, to the general interest. To talk of the private benefit to be derived by, or the detriment which may be occasioned, personally, to a few large land holders in Cincinnati, by the consummation of so important a work, is altogether too trivial a matter comparatively, for consideration. The following article, in reference to Mr. Roebling's report, we take from the Cincinnati News. The editor observes that "this question promises to be warmly agitated during the present winter. The friends of the project, we discover, are busily engaged in marshalling their forces, and a most vigorous effort will probably be made to force a charter from the legislature of Ohio, at the approaching session of that body. On the other hand, the enemies of the project are quite as active and busy as its advocates; and upon what banner victory will finally perch, seems to be involved in great uncertainty."

"In May last," continues the News, "MR.

ROEBLING and Mr. R. H. RICEY, made a survey across the river, from Cincinnati to Covington, in the line of Main street—the proposed location of the bridge. The plan is drawn on that survey. The length of the proposed structure from centre to centre of abutments, is 1576 feet—total length, including approaches, 2070 feet. Two spans are proposed, which will meet in the centre of the river upon a gigantic stone pier, 200 feet high. The river front of the Cincinnati abutment, will be opposite the corner of Wharf and Main—the length of the abutment will be 50 feet, the extreme width across the return walls, opposite Water street, will be 44 feet, and reduced to 38 feet at Front street. There will, therefore, be a space occupied on the public landing of 200 feet long by 44 ft. wide, leaving the wharf between the abutment and the edge of the river entirely free and open. The approach on the Covington side is very nearly the same as on the Cincinnati side.

"Each of the two spans measures 788 feet from centre to centre; the length of the floor between the abutment and the pier is 788 ft.

"Two isolated towers of 30 feet high and at a distance of 30 feet apart from centre to centre, are erected upon each abutment, for the support of the cables. The latter rest in cast iron saddles, which are allowed to move on rollers, for the purpose of adjusting the tensions of the land cables, as they contract or expand, either from changes of temperature or from loads. The castings which support the cables upon the centre tower, are stationary and not allowed to move.

"The floor of the bridge is to be composed of timber and plank, and to be suspended by means of two wire cables and a number of wire stays, and will be divided into a roadway of 20 feet 6 inches wide, and two side-walks of 6 feet wide each. The distance across the floor, between the railings, will be 34 feet.

"The floor is proposed to be suspended at an elevation of 90 feet above low water, near the wharf, and at an elevation of 121 feet near the pier. From this deduct four feet of framing below the floor, leaving 117 feet clear next the centre pier, and 86 feet next the wharf.

"All elevations in the report, or in the plans, are referred to low water line, which is assumed at 63 feet below the high water mark of 1832. A depth of water in the river of 20 feet above low water mark is considered a medium stage; 30 feet is called high water; 45 feet is a flood, which seldom occurs. A flood of the height of 1832 may not be witnessed again in 100 years. Supposing the river to be 45 feet high, which is an unusual rise; this will leave 72 feet clear height near the centre pier. Pike No. 7, measuring 69 feet, will therefore have three feet to spare in clearing the bridge. But most of those packets which run on the lower trade, are provided with joints for lowering the chimneys, for the purpose of passing the arch over the Louisville canal. By lowering the chimneys, therefore, the largest class of steamers will be enabled to pass the

Cincinnati bridge in the highest stage of water.

"Mr. Roebling estimates that the construction of the Cincinnati bridge may be accomplished for a sum of *three hundred and seventy-four thousand four hundred and sixty dollars*. And that three years will be required to finish the job. No estimate is made of the probable revenue of the work, but the engineer seems to have arrived at the conclusion, that no better scheme for a safe investment was ever presented to the capitalists of this country, than the contemplated formation of a joint stock company for the erection of the Cincinnati bridge.

"Whether the legislature of Ohio will follow the example of that of Kentucky, and grant a charter for the bridge company, and whether the money can be raised to complete the structure, after the charter is granted, are questions which time will only determine. About the latter contingency, however, there can be but little difficulty. Among the persons who are the most deeply interested in the project, we know half a dozen, either of whom can build the bridge at any time upon their own hook. The great trouble in the way—aside from certain private interests that may be affected by the consummation of the work—appears to be the apprehension that by the erection of the bridge, the free navigation of the river may be interrupted."

The report is voluminous, but highly interesting—and is written in an intelligible and sensible manner. Mr. Roebling understands well the subject he speaks of, and we shall be happy to know that his talents have been engaged upon another work of a similar character to the magnificent structures at Piusburg, completed last year under his superintendence. It is an undertaking of vast magnitude, but Mr. R. is fully equal to it—and if the plan should be carried out, the "Queen City of the West" will have a lasting architectural monument which few cities in the world can boast of. We hope and expect to see the project consummated at an early day.

#### Pennsylvania Railroad.

We are informed by the Harrisburg Argus, that a highly respectable meeting of the citizens of Harrisburg, was held at the court house on Friday evening, the 11th inst., in reference to the Pennsylvania railroad, which was organized by calling the Hon. DAVID R. PORTER to the chair. John A. Weir and Charles Carson, Esqrs., were appointed vice presidents, and the editors of the several papers were invited to act as secretaries.

William Ayres, Esq., on behalf of the commissioners, made a statement of the progress of the work thus far and the probabilities of its early commencement and completion. He referred to its great importance to Harrisburg, to Philadelphia and Piusburg, and to the state at large, and closed by submitting the following resolutions, which were unanimously adopted:

**Resolved**, That in the opinion of this meeting, the Pennsylvania railroad from Philadelphia to Pittsburg, is an improvement which, if prosecuted to an early completion, will be of incalculable advantage to Pennsylvania—making her as it undoubtedly will, the great chain of communication between the waters of the east and the west, and establishing her commercial emporium as the



depot for the sale of the rich products of the valley of the Mississippi and the Lakes, and the market for the purchase of the supplies for those vast and flourishing regions.

**Resolved**, That we no longer view this improvement as problematical. The recent action of the corporate authorities of the city of Philadelphia, authorizing the subscription of \$2,500,000 to the stock of this company, and the energy displayed by the commissioners in obtaining additional individual aid, has placed it beyond all doubt, that the necessary funds will be obtained, and that the work will be commenced in a very short period.

**Resolved**, That we urge the commissioners to persevere in their present energetic course, and to extend the plan of their operations by the appointment of additional committees to aid them in obtaining subscriptions in every town and county throughout the state, where additional subscriptions might reasonably be expected.

**Resolved**, That we will render all the assistance in our power to the commissioners appointed for Dauphin county, in enabling them to obtain subscriptions, so that this great work, which we regard as of vital importance to the interest and welfare of Pennsylvania, may be commenced at the earliest practicable period.

**Resolved**, That we recommend the commissioners of Dauphin county to meet forthwith, and appoint committees to solicit further subscriptions from the citizens of Harrisburg.

**Resolved**, That the proceedings of this meeting be published.

Judge Bucher and Gov. Porter also addressed the meeting briefly in reference to the importance of this great enterprise to Pennsylvania, and especially to Harrisburg, and appealed to the citizens, capitalists, and business men, mechanics, and all classes, to come forward and lend a hand in pushing it on. It was a great matter for Harrisburg that this work should go on—it could not fail greatly to benefit our town, and almost all mechanics and men in business could subscribe one or more shares without inconvenience and should do so.

The meeting adjourned in fine spirits.

#### Improved Spark Arrester.

A new and valuable improvement is said to have been lately made by Mr. James Milholland, superintendent of road and machinery on the Baltimore and Susquehanna railroad, which, applied to the locomotive engines, completely arrests the sparks, while its construction permits the smoke to escape freely. The advantages of this improvement must be appreciated (if it proves fully successful) by the travelling public, who have been so long subjected to the annoyances arising from the locomotive cinders. The Baltimore Sun contains the following in relation to this invention:

"The importance of this arrangement in respect to the danger to buildings and merchandise in the train, is such, that without it, steam power on railroads would prove almost an abortion, and the world would be deprived of the immense advantages resulting therefrom. This was obvious upon the first trial of locomotives in this country, when wood was used for fuel. In the year 1831, the first locomotive intended for the Camden and Amboy railroad, was brought from England. It

being without any contrivance for this purpose, could not be used, the sparks completely enveloping the engineer, and threatening to scatter fire and destruction wherever she went. Several contrivances to arrest the sparks were unsuccessfully tried. In 1833, shortly before that road was completed. Mr. R. L. Stephens, the president of the company, suggested the use of a bonnet of wire gauze to the smoke pipe, which was tried in several forms, until at last it assumed the shape of a frustrum of an inverted cone, surrounding the pipe for some distance below the top and covered by a hemispherical cap of the same material. This arrangement was found to arrest the sparks which fell into the conical pocket formed around the pipe by the lower part of the wire gauze; but here another difficulty arose; the accumulated sparks were fanned by the rush of air produced by the rapid motion of the engine, into a fierce fire, which soon destroyed the wire netting, permitting them to escape as before. The most obvious remedy for this was to exclude the air, which was done by enclosing the lower part of the cone with sheet iron, which answered very well until the accumulation of sparks filled the iron, when they were again ignited by the rush of air; another and another portion of the cone was covered until it was found necessary to have the whole of the inverted cone made of sheet iron with a door in the lower part, to extract the extinguished sparks from time to time during stoppages. In order to enlarge this receptacle for the sparks, the cone was extended the whole of the way down the pipe, which arrangement is at present in use in various modifications on the railroads of the U. States. By one of those singular coincidences which often occur in the discovery of useful improvements, the same results were obtained by Mr. H. C. Wyatt, of Weldon, N. C., in a course of humbler experiments. He adapted the same arrangement to the bowl of a tobacco pipe, and by blowing into the stem of the pipe, the smoke was driven through a perforated tin cover and the sparks arrested in the same manner precisely. Mr. Wyatt obtained a patent for his invention, for the infringement of which, his assignee lately recovered a verdict in the U. S. Circuit court.

Mr. Milholland's improvement consists of a globe of perforated sheet iron covering the top of the smoke pipe, surrounded at a short distance by a shield of close sheet iron to exclude the air, with an opening at the top sufficient to permit the escape of the smoke. From the bottom of the perforated globe a pipe conducts the sparks into an air-tight iron box sufficient to contain all the sparks arrested during the usual trip of the engine. This box Mr. M. calls by the expressive term of the sub-treasury. The large and powerful locomotive William H. Watson, lately built under the superintendence of Mr. Milholland, at the Boulton depot, is fitted up with this improvee spark arrester, and we are informed it fully answers his expectations.

#### Boston and New York Railroad.

We are glad to find that the parties interested in this enterprise, have commenced operations in earnest,

and it is also gratifying to know that men of repute and energy have the matter in hand. The following in relation to the proposed route, we find in a late number of the Boston Times:

There was a meeting, for consultation, of the friends of an independent central railroad to New York, at the Exchange Coffee House, on Thursday evening last. George R. Russell, Esq., presided, and A. Davis, Esq., was appointed secretary. The meeting was addressed by Messrs. C. T. Russell, T. Richardson, Dr. Phelps, W. Farnham and others.

The route has recently been surveyed by a distinguished engineer, under the direction of several gentlemen of this city and others who feel an interest in the project. The line, we learn, passes through Roxbury (near to Jamaica Plain, and through West Roxbury), Dedham, Medfield, through portions of Franklin, Medway, and Bellingham to Blackstone; from thence to unite with one of the Connecticut projects through to New York city.—The route is spoken of as payable, central and direct.

The following gentlemen were appointed upon the committees:—

**General Committee**—Messrs. George R. Russell, of West Roxbury; Wm. H. Prentice, Gardiner Colby, Adolphus Davis, Wm. Wright, and Thomas Richardson, of Boston; Welcome Farnum, of Blackstone; Charles Ellis, Stephen M. Weld, Joseph N. Brewer, Joseph H. Billings, of Roxbury; Merrill D. Ellis and Oliver Capen, of Dedham.

**Finance Committee**—Messrs. A. D. Weld, Charles Ellis, Stephen M. Weld, Samuel F. Morse, Benjamin H. Tubbs, Martin Bates.

The general committee were directed to call a meeting of the friends of this route at such time and place as they might deem proper.

#### (Official) Reading Railroad.

A comparative statement of the business on the Philadelphia and Reading railroad for the month ending Nov. 30th.

	1844.	1845.	1846.
Travel .....	\$7,528 31	\$8,270 49	\$11,095 36
Freight on goods.	3,929 44	5,261 11	10,369 62
Do. do. coal..	49,956 15	111,621 59	160,087 61
Miscell's receipts.		10	65 05
Transp. U.S. mail.	763 33	783 33	783 33
	\$62,197 23	125,946 52	182,401 27
Coal trans., tons..	44,513	88,799	112,104

A comparative statement of the business on the Philadelphia and Reading railroad for the week ending—

	Dec. 7, 1844.	Dec. 6, 1845.	Dec. 5, 1846.
Travel .....	\$1,277 22	\$1,760 96	\$2,494 43
Freight on goods.	992 45	1,760 86	2,624 50
" coal...	8,468 66	3,912 42	37,510 57
	\$10,738 33	\$7,434 24	\$42,629 50
Coal trans.—tons.	8,620	3,073	26,402

#### CINCINNATI AND DAYTON RAILROAD.

Books for the subscription of the stock of this road, says a late number of the Cincinnati Gazette, will be opened at the Exchange rooms in this city on the 1st of December, 1846. We hope stock enough will be taken to organize the company under the charter—and that other initiative steps may be taken immediately thereafter. The stock in all probability will yield a good dividend. It certainly will if the charter can be suitably amended.

An article addressed to the city council appeared in Monday's Atlas on the subject. It recommends that the council provide for selling the stock owned by the city in the Little Miami road, and the invest-

ment of the proceeds in the stock of the Cincinnati and Dayton road. Admitting that the city government did its duty in aiding in the construction of the Little Miami road, "for the purpose of increasing our whole business, population and wealth," the writer insists, that council having done its duty in that respect—and done it well—should proceed, with a view of accomplishing like good in like manner, to sell the two hundred thousand dollars stock in the Little Miami road, and use the proceeds to build another and a better road through Hamilton and Dayton, branching to Urbana and the lake on one side, and to Richmond and the valley of the Missisquoi in Indiana, on the other. In favor of this scheme the writer affirms "these truths," as he insists, establishing "the superior advantages of the new road."

1st. It will be much the quickest route, on account of its lesser grades, straighter lines and wider curves.  
2d. It may be the shorter, too, in positive distance, to the lake and eastern cities.

3d. It will be very much cheaper per mile.

4th. It will turn into the current of Cincinnati trade, the vast and infinitely valuable products of a region not yet secured to her.

5th. It will create a new market for our city—that of the raw material for manufactures, at Hamilton, Dayton, etc.—thus rearing them into western Lowells, and Cincinnati into more than a western Boston.

It will do no harm to examine into the subject, if nothing else is done.

#### English Iron Trade.

We have, by the Cambria, the London Mining Journal of 21st and 28th November; and make the following extracts. The quotations of November 20th are as follows:

	£.	s.	£.	s.	d.
Bar a Wales—ton.....	8	15	9	0	0
" London.....	0	0	10	0	0
Nail rods.....	0	0	10	15	0
Hoop (staf.).....	11	5	11	10	0
Sheet.....	0	0	13	0	0
Bars.....	11	0	11	10	0
Welsh cold blast foundry pig.....	5	5	5	10	0
Scotch pig b Clyde.....	3	9	3	12	6
Rails, average.....	0	0	10	0	0
Russian, CCND.....	0	0	0	0	0
" PST.....	0	0	0	0	0
" Goureff.....	0	0	0	0	0
" Archangel.....	0	0	13	10	0
Swedish d, on the spot.....	0	0	11	10	0
" Steel, fagt.....	0	0	16	0	0
" " kegs e.....	14	5	14	10	0

a, discount 2½ per cent; b, net cash; c, discount 2½ per cent; d, ditto; e, in kegs ½ and ¾ inch.

#### From our Correspondent.

IRON.—Welsh and Staffordshire continue steady; in Scotch pigs very little has been done since last Mining Journal, and there are sellers at quotations. COPPER is firm in price, with fair demand.

TIN.—(English) continues scarce, the supply being unequal to the demand; the stock of foreign is very small—a slight improvement in this metal has taken place.

LEAD is steady.

Communicated by Messrs. Whitcomb & Barton.

All descriptions of English iron continue firm, with an upward tendency. Scotch pig iron has been rather quiet, and few sales made this week—mixed Nos. may be quoted at 71s. to 71s. 6d. cash; a further advance of £3 per ton has taken place in English tin. No alteration in other metals.

GLASGOW PIG IRON TRADE.—Nov. 18.—We advised an improvement in prices in our last—this has not been maintained; and we quote prices to-day at 70s. for No. 3; 71s. to 71s. 6d. for mixed Nos.; and 72s. 6d. for No. 1—cash. A moderate amount of business doing.

DOUGLAS & HILL, Metal Brokers.

The quotations of the 27th for rails are a shade lower—being £9 15s. average—other kinds remain much the same as previous week. The price of rail will, however, in our opinion, advance, as the demand will undoubtedly increase.

#### Hot and Cold Blast Iron.

The following paragraph contains information of great importance to the manufacturer of iron. It is copied from the London Mining Journal of 21st ult.

A correspondent in Newcastle writes as follows: Mr. R. Stephenson, the eminent engineer, has been making a series of experiments upon the relative strengths of hot and cold blast iron, the result of which will be a complete revolution in the iron trade. Hitherto cold blast iron has brought a higher price, and has been considered in every respect superior to hot blast. Previous, however, to the construction of the high level bridge at Newcastle-upon-Tyne, intended to connect the York and Newcastle with the Newcastle and Berwick railway, Mr. Stephenson caused more than 100 experiments to be made with the various sorts of pig iron, the result of which has been to prove that hot blast is superior to cold, in the proportion of 9 to 7; and, moreover, that pig iron, No. 3, is better iron than No. 1, which, up to this time, has sold much higher in the market.

#### Contract for Iron Rails, etc.

The governor of Brabant has concluded contracts for 2000 tons iron rails, 600 tons iron sleepers, 20 excentrics complete, and 33 tons pins, divided into 10 lots, required for establishing double lines on the state railways of Belgium: 1st lot, 500 tons rails were contracted for by M. Pastor, of Cockerill and Co, Seraing, at £4 16s. 8d. per ton; the other lots, of 500 tons each, were taken by Belgian and French foremasters at the same rate; 5th lot, 150 tons iron sleepers was taken by M. Elias, of Selessin, at £8 8s. 2d. per ton; 6th lot, 150 tons to M. Dupont, at £7 16s. 8d. per ton; 7th lot, 150 tons iron sleepers, by Messrs. Cambier & Fontain, at £8 4s. 2d. per ton; 8th lot, 150 tons to M. Dupont, at £7 16s. 8d.; 9th lot, 33 tons pins at £15 2s. 6d.; and 10th lot, 20 excentrics, at £15 8s. 4d. per ton. There was great competition to obtain these contracts, as they are expected to lead to other extensive affairs.

Great Northern, (London and York).—About 75,000 tons of iron rails will be required for the formation of the entire line during 1847 and 1848. The first instalment of sleepers on which to lay them amounts to 500,000.

#### Menai Tabular Bridge.

We give in this number an abstract of Mr. Stephenson's report in relation to this bold project of his for spanning the straits of Menai, the distance of four hundred and fifty feet, by a wrought iron tubular bridge! The boldness of the project is only in character with the man; and the plan and the place are worthy of his reputation, and show the astonishing progress, within the last twenty years, of civil engineering.

We shall give in succeeding numbers, several well written articles, with illustrations, showing the result of numerous experiments made to decide upon the form and strength of the tube; as we presume that our readers will, as we shall ourselves, watch the progress of this work with interest.

The following is an abstract of the report on this gigantic undertaking, made by Mr. Robert Stephenson to the Chester and Holy-

head railway company, and read at their last meeting.

I have throughout the experiments carefully studied the results as they developed themselves, and I am satisfied that the views I ventured to express twelve months ago were in the main correct, and that the adoption of a wrought iron tube is the most efficient, as well as the most economical description of structure that can be devised for a railway bridge across the Menai straits.

In the course of the experiments, it is true, some unexpected and anomalous results presented themselves; but none of them tended, in my mind, to show that the tubular form was not the very best for obtaining a rigid roadway for a railway over a span of 450 ft. which is the absolute requirement for a bridge over the Menai straits.

The first series of experiments was made with plain circular tubes, the second with elliptical, and the third with rectangular. In the whole of these, this remarkable and unexpected fact was brought to light, viz, that in such tubes the power of wrought iron to resist compression was much less than its power to resist tension, being exactly the reverse of that which holds with cast iron; for example, in cast iron beams for sustaining weight, the proper form is to dispose of the greater portion of the material at the bottom side of the beam, whereas, with wrought iron, these experiments demonstrate beyond any doubt that the greater portion of the material should be distributed on the upper side of the beam. We have arrived therefore at a fact having a most important bearing upon the construction of the tube, viz, that rigidity and strength are best obtained by throwing the greatest thickness of material into the upper side.

Another instructive lesson which the experiments have disclosed is, that the rectangular tube is by far the strongest; that the circular and elliptical should be discarded altogether.

This result is extremely fortunate, as it greatly facilitates the mechanical arrangements for not merely the construction, but the permanent maintenance of the bridge.

We may now, therefore, consider that two essential points have been finally determined, the form of the tube and the distribution of the material.

The only important question now remaining to be solved is, the absolute ultimate strength of a tube of any given dimensions. This is, of course, approximately solved by the experiments already completed; but Mr. Hodgkinson very properly states, that others, with tubes of more varied dimensions, should be continued, in order to clear up some anomalies which still exist.

The formula, as at present brought out by Mr. Hodgkinson, gives the strength of a rectangular tube of the dimensions I proposed, viz., 450 feet long, 15 feet wide, by 30 feet high (assuming the plates to be one inch thick) equal to 1,100 tons applied in the centre, including the weight of the tube itself; but, deducting the latter, equal to 747 tons in the centre, or double this, supposing the



weight to be uniformly distributed over the whole 450 feet.

This amount of strength, although sufficient to carry any weight that can in practice be placed upon the bridge, is not sufficiently in excess for practical purposes. It is on this ground, therefore, I have requested Mr. Hodgkinson to devise a few more experiments in the shape best calculated to free the formula from all ambiguity. In the meantime, however, as I consider the main question settled, I am proceeding with the designs and working plans for the whole of the masonry, which I expect to have the pleasure of submitting to you in a fortnight from this time.

You will observe in Mr. Fairbairn's remarks, that he contemplates the feasibility of stripping the tube entirely of all the chains that may be required in the erection of the bridge; whereas, on the other hand, Mr. Hodgkinson thinks the chain will be an essential, or at all events a useful auxiliary, to give the tube the requisite strength and rigidity. This, however, will be determined by the proposed additional experiments, and does not interfere with the construction of the masonry, which is designed so as to admit of the tube with or without the chains.

The application of chains as an auxiliary, has occupied much of my attention, and I am satisfied that the ordinary mode of applying them to suspension bridges is wholly inadmissible in the present instance; if, therefore, it be found hereafter necessary or desirable to employ them in conjunction with the tube, another mode of applying them must be devised, as it is absolutely essential to attach them in such a manner as to preclude the possibility of the smallest oscillation.

In the accomplishment of this I see no difficulty whatever; and the designs have been arranged accordingly, in order to avoid any further delay.

The injurious consequences attending the ordinary mode of employing chains in suspension bridges were brought under my observation in a very striking manner on the Stockton and Darlington railway, where I was called upon to erect a new bridge for carrying the railway across the river Tees, in lieu of an ordinary suspension bridge, which had proved an entire failure.

Immediately on opening the suspension bridge for railway traffic, the undulations into which the roadway was thrown, by the inevitable unequal distribution of the weight of the train upon it, were such as to threaten the instant downfall of the whole structure.

These dangerous undulations were most materially aggravated by the chain itself, for this obvious reason—that the platform or roadway which was constructed with ordinary trussing for the purpose of rendering it comparatively rigid, was suspended to the chain, which was perfectly flexible, all the parts of the latter being in equilibrium. The structure was, therefore, composed of two parts, the stability of the one being totally incompatible with that of the other; for example, the moment an unequal distribution of weight upon the roadway took place, by the passage of a train, the curve of the chain

altered, one portion descending at the point immediately above the greatest weight, and consequently causing some other portion to ascend in a corresponding degree, which necessarily raised the platform with it, and augmented the undulation.

So seriously was this defect found to operate, that immediate steps were taken to support the platform underneath by an ordinary trussing; in short, by the erection of a complete wooden bridge, which took off a large portion of the strain upon the chains. If the chains had been wholly removed, the substructure would have been more effective; but as they were allowed to remain, with the view of assisting, they still partake of these changes in the form of the curve consequent upon the unequal distribution of the weight, and eventually destroyed all the connections of the wooden framework underneath the platform, and even loosened and suspended many of the piles upon which the framework rested, and to which it was attached.

The study of these and other circumstances connected with the Stockton bridge lead me to reject all idea of deriving aid from chains employed in the ordinary manner.

I have therefore turned my attention to other modes of employing them in conjunction with the wrought iron tube (as suggested by Hodgkinson,) if such should be found necessary upon further investigation.

As I have already stated in this I perceive no difficulty whatever; indeed there is no other construction which has occurred to me which presents such facilities as the rectangular tube for such a combination.

Having, I trust, clearly explained my views in reference to this important work I have only to add that in two months I expect every arrangement will be completed for commencing the masonry, which shall be conducted with the utmost activity and vigor.

I can scarcely venture to say, until after these arrangements are finally completed, at what period we may calculate upon the completion of this bridge; but I cannot recommend you to calculate upon the whole being accomplished in less than two years and a half.

#### Miscellaneous Items.

**Erie Canal Tolls.**—We are indebted to H. P. Thayer, Esq., canal collector at this port, for the following statement of tolls received at his office during the past season:

1846.....	\$763,429 62
1845.....	482,635 41
Increase in 1846.....	\$280,794 21

The increase of tolls, which is nearly 100 per cent, over last year, affords good evidence of the rapid increase of business in this city and upon the entire canal. A corresponding increase another season, would swell the tolls collected at this port to a sum exceeding one million of dollars!

**Rutland Railroad.**—Eighty-four miles of the Champlain and Connecticut river railroad are advertised to be let to contractors on the 1st of January next; 34 miles from Bellows Falls to Mount Holley, including the summit, and 50 miles from Burlington to the vil-

lage of Brandon. The Burlington Free Press informs us that "Mr. Gilbert and his party are now actively engaged on the line of the road from Mount Holley to Duttonville: high in the esteem and confidence of the corporation whose chief engineer he is." We are happy to hear it. If we had any anxiety in the matter, it is now relieved, and we wish Mr. Gilbert and his party all conceivable happiness.

**Peterboro' Railroad.**—We understand the grading, bridging and masonry, of the Peterboro' railroad, from the Fitchburg track to Townsend, has been put under contract, on favorable terms for the company, and the work will be immediately commenced.

**Lewiston and Waterville Railroad.**—A committee of citizens of Waterville, says the Portland Advertiser, have prepared and printed valuable tables of statistics to show the estimated trade and travel over the Androscoggin and Kennebec railroad. It is in pamphlet form, and comprises also the report of Mr. Hall on the exploration of the route. We hope it will be thoroughly circulated.

In the Argus of Monday last, was an excellent article of statistics, facts and comparisons, commendatory of the same enterprise from a correspondent in whose authority we have reason to place much confidence.

**Wealth of the State of Ohio.**—We learn by a letter from a friend in Ohio, that the state board of equalization concluded its labors at Columbus on the 16th ult., after a session of more than three weeks, of which the following are the aggregate results:

The valuation of the real property of Ohio is about \$324,000,000.

The personal property is valued at \$79,117,484, making an aggregate of real and personal property to the amount of \$403,117,484, that is to say, more than four hundred and three millions of dollars.—*Nat. Intel.*

**Good Business.**—A Boston paper states that all the railroads in Massachusetts are reaping rich harvests at the present time. At no period of the past year have they suffered with the other interests of the country. They are the cheapest and most expeditious modes of conveyance for passengers, merchandize, mails, expresses, etc.; and in peace or in war the public are impelled by their own comfort, convenience and interest, to give them employment, tasking them at times to their utmost capacity. The Maine, Fitchburg, Worcester and Western roads have done the largest business in freights, and the two latter have been doing a most successful general traffic throughout the season. The financial year of the Worcester and Western closes with the present week, when their accounts will be made up; the former for six months, and the latter for five.

**RAILROAD IRON.—THE "MONTGOMERY" Iron Company,** Danville, Pa., is prepared to execute orders for the heavy Rail Bars of any pattern now in use, in this country or in Europe, and equal in every respect in point of quality. Apply to **MURDOCK, LEAVITT & CO.,** Agents.

Corner of Cedar and Greenwich Sts. 48 1y





**RICH & CO'S IMPROVED PATENT SALAMANDER SAFES.**

Warranted free from dampness, as well as fire and thief proof.

Particular attention is invited to the following certificates, which speak for themselves:

TEST No. 10.

*Certificate from Mr. Silas C. Field, of Vicksburgh, Mississippi.*

On the morning of the 14th ult., the store owned and occupied by me in this city, was, with its contents, entirely consumed by fire. My stock of goods consisted of oil, rosin, lard, pork, sugar, molasses, liquors, and other articles of a combustible nature, in the midst of which was one of Rich's Improved Patent Salamander Safes, which I purchased last October of Mr. Isaac Bridge, New Orleans, and which contained my books and papers. This safe was red hot, and did not cool sufficiently to be opened until 16 hours after it was taken from the ruins. At the expiration of that time it was unlocked, when its contents proved to be entirely uninjured, and not even discolored. I deem this test sufficient to show that the high reputation enjoyed by Rich's Safes is well merited.

S. C. FIELD.

TEST No. 11.—*Certificate.*

By the fire which occurred in this village on the 27th July last, our Law Office, together with many other buildings, was destroyed—we had in our office one of Rich's Improved Patent Salamander Safes, which, though heated red hot, preserved, without being the least damaged, many papers valuable to our clients—the envelopes of a few papers being slightly scorched. Some twenty-four hours after the fire, the Safe was removed, and so hot was it, that several hours were required for it to cool off. Our office was in the second story of a large brick building, all the wood used in construction of said house being pitch pine. While the Safe was red hot, one of the walls tumbled in, and so injured the lock that it was necessary to break the door open. From this test, we feel no hesitancy in recommending "Rich's Patent Salamander Safe" as entirely fire proof.

GONNS & KING.

Marion, Ala., Sept. 15th, 1846.

*Still other Tests in the Great Fire of July 19, 1845.*

The undersigned purchased of A. S. Martin, No. 138½ Water street, one of Rich's Improved Patent Salamander Safes, which was in our store, No. 54 Exchange place. The store was entirely consumed in the great conflagration on the morning of the 19th inst. The safe was taken from the ruins 52 hours after, and on opening it, the books and papers were found entirely uninjured by fire, and only slightly wet—the leather on some of the books was parched by the extreme heat.

RICHARDS & CRONKHITE.

Benton, Miss., December 27, 1845.

One of Rich's Improved Salamander Safes, which I purchased on the 2d of June last of A. S. Marvin, 138½ Water street, agent for the manufacturer, was exposed to the most intense heat during the late dreadful conflagration. The store which I occupied, No. 46 Broad street, was entirely consumed; the safe fell from the 2d story, about 15 feet, into the cellar, and remained there 14 hours, and when found, I am told, and from its appearance afterwards, should judge that it had been heated to a red heat. On opening it, the books and papers were found not to have been touched by fire. I deem this ordeal sufficient to confirm fully the reputation that Rich's safe has already obtained for preserving its contents against all hazards. (Signed.)

WM. BLOODGOOD.

New York, 21st July, 1845.

Reference made to upwards of nine hundred and fifty merchants, cashiers, brokers, and officers of courts and counties, who have Rich's Safe's in use.

The above safes are finished in the neatest manner, and can be made to order at short notice, of any size and pattern, and fitted to contain plate, jewelry, etc. Prices from \$50 to \$500 each. For sale by

A. S. MARVIN, General Agent,  
138½ Water st., N. Y.

Also by Isaac Bridge 76 Magazine street, New Orleans.

Also by Lewis M Hatch, 120 Meeting street Charleston, S. C.

16 tf

**FRENCH AND BAIRD'S PATENT SPARK ARRESTER**

TO THOSE INTERESTED IN Railroads, Railroad Directors and Managers are respectfully invited to examine an improved SPARK ARRESTER, recently patented by the undersigned.

Our improved Spark Arresters have been extensively used during the last year on both passenger and freight engines, and have been brought to such a state of perfection that no annoyance from sparks or dust from the chimney of engines on which they are used is experienced.

These Arresters are constructed on an entirely different principle from any heretofore offered to the public. The form is such that a rotary motion is imparted to the heated air, smoke and sparks passing through the chimney, and by the centrifugal force thus acquired by the sparks and dust they are separated from the smoke and steam, and thrown into an outer chamber of the chimney through openings near its top, from whence they fall by their own gravity to the bottom of this chamber; the smoke and steam passing off at the top of the chimney, through a capacious and unobstructed passage, thus arresting the sparks without impairing the power of the engine by diminishing the draught or activity of the fire in the furnace.

These chimneys and arresters are simple, durable and neat in appearance. They are now in use on the following roads, to the managers and other officers of which we are at liberty to refer those who may desire to purchase or obtain further information in regard to their merits:

R. L. Stevens, President Camden and Amboy Railroad Company; Richard Peters, Superintendent Georgia Railroad, Augusta, Ga.; G. A. Nicolls, Superintendent Philadelphia, Reading and Pottsville Railroad, Reading, Pa.; W. E. Morris, President Philadelphia, Germantown and Norristown Railroad Company, Philadelphia; E. B. Dudley, President W. and R. Railroad Company, Wilmington, N. C.; Col. James Gadsden, President S. C. and C. Railroad Company, Charleston, S. C.; W. C. Walker, Agent Vicksburgh and Jackson Railroad, Vicksburgh, Miss.; R. S. Van Rensselaer, Engineer and Sup't Hartford and New Haven Railroad; W. R. M'Kee, Sup't Lexington and Ohio Railroad, Lexington, Ky.; T. L. Smith, Sup't New Jersey Railroad Trans. Co.; J. Elliott, Sup't Motive Power Philadelphia and Wilmington Railroad, Wilmington, Del.; J. O. Sterns, Sup't Elizabethtown and Somerville Railroad; R. R. Cuyler, President Central Railroad Company, Savannah, Ga.; J. D. Gray, Sup't Macon Railroad, Macon, Ga.; J. H. Cleveland, Sup't Southern Railroad, Monroe, Mich.; M. F. Chittenden, Sup't M. P. Central Railroad, Detroit, Mich.; G. B. Fisk, President Long Island Railroad, Brooklyn.

Orders for these Chimneys and Arresters, addressed to the subscribers, care Messrs. Baldwin & Whitney, of this city or to Hinckley & Drury, Boston, will be promptly executed. FRENCH & BAIRD.

N. B.—The subscribers will dispose of single rights, or rights for one or more States, on reasonable terms. Philadelphia, Pa., April 6, 1844.

••• The letters in the figures refer to the article given in the Journal of June, 1844. ja45

**PATENT HAMMERED RAILROAD, SHIP and Boat Spikes.** The Albany Iron and Nail Works have always on hand, of their own manufacture, a large assortment of Railroad, Ship and Boat Spikes, from 2 to 12 inches in length, and of any form of head. From the excellence of the material always used in their manufacture, and their very general use for railroads and other purposes in this country, the manufacturers have no hesitation in warranting them fully equal to the best spikes in market, both as to quality and appearance. All orders addressed to the subscriber at the works, will be promptly executed. JOHN F. WINSLOW, Agent.

Albany Iron and Nail Works, Troy, N. Y. The above spikes may be had at factory prices, of Erastus Corning & Co., Albany; Hart & Merritt, New York; J. H. Whitney, do.; E. J. Etting, Philadelphia; Wm. E. Coffin & Co., Boston. ja45

**MACHINE WORKS OF ROGERS,** Ketchum & Grosvenor, Patterson, N. J. The undersigned receive orders for the following articles, manufactured by them of the most superior description in every particular. Their works being extensive and the number of hands employed being large, they are enabled to execute both large and small orders with promptness and despatch.

Railroad Work.

Locomotive steam engines and tenders; Driving and other locomotive wheels, axles, springs & flange tires; car wheels of cast iron, from a variety of patterns, and chills; car wheels of cast iron with wrought tires; axles of best American refined iron; springs; boxes and bolts for cars.

Cotton, Wool and Flax Machinery of all descriptions and of the most improved patterns, style and workmanship.

Mill gearing and Millwright work generally; hydraulic and other presses; press screws; callenders; lathes and tools of all kinds; iron and brass castings of all descriptions.

ROGERS, KETCHUM & GROSVENOR, Paterson, N. J., or 60 Wall street, N. York.



**PATENT RAILROAD, SHIP AND BOAT Spikes.** The Troy Iron and Nail Factory keeps constantly for sale a very extensive assortment of Wrought Spikes and Nails, from 3 to 10 inches, manufactured by the subscriber's Patent Machinery, which after five years' successful operation, and now almost universal use in the United States (as well as England, where the subscriber obtained a patent) are found superior to any ever offered in market.

Railroad companies may be supplied with Spikes having countersink heads suitable to holes in iron rails, to any amount and on short notice. Almost all the railroads now in progress in the United States are fastened with Spikes made at the above named factory—for which purpose they are found invaluable, as their adhesion is more than double any common spikes made by the hammer.

All orders directed to the Agent, Troy, N. York will be punctually attended to.

HENRY BURDEN, Agent.

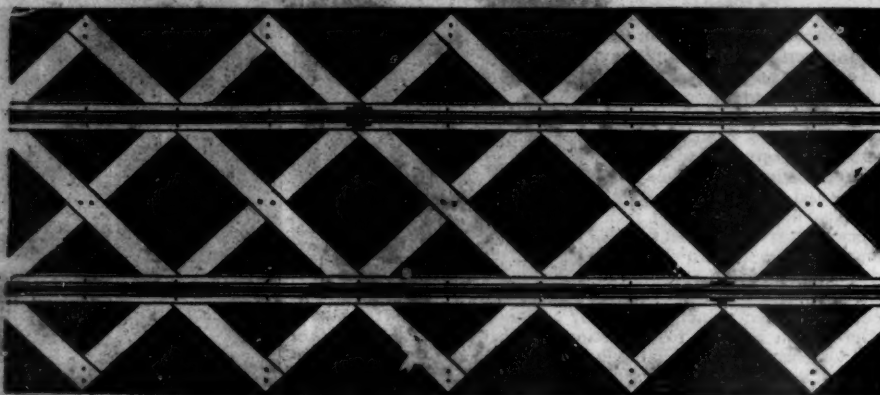
Spikes are kept for sale, at Factory Prices, by I. & J. Townsend, Albany, and the principal iron merchants in Albany and Troy; J. I. Brower, 222 Water St., New York; A. M. Jones, Philadelphia; T. Janviers, Baltimore; Degrand & Smith, Boston.

••• Railroad Companies would do well to forward their orders as early as practicable, as the subscriber is desirous of extending the manufacturing so as to keep pace with the daily increasing demand. ja45

**DAVENPORT & BRIDGES CONTINUE** to Manufacture to Order, at their Works, in Cambridgeport, Mass., Passenger and Freight Cars of every description, and of the most improved pattern. They also furnish Snow Ploughs and Chilled Wheels of any pattern and size. Forged Axles, Springs, Boxes and Bolts for Cars at the lowest prices. All orders punctually executed and forwarded to any part of the country.

Our Works are within fifteen minutes ride from State street, Boston—coaches pass every fifteen minutes. 1y1

## THE HERRON RAILWAY TRACK,



As seen stripped of the top ballasting

A GOLD MEDAL AWARDED THE INVENTOR BY THE AMERICAN INSTITUTE.

**THE UNDERSIGNED RESPECTFULLY** invites the attention of Engineers, and Railroad Companies, to some highly important improvements he has recently made in the Herron system of Railway structure. These improvements enable him to effect a very large reduction in the quantity of Timber, and cost of construction, without impairing the strength of the Track, or its powers of resisting frost, while they secure additional features of excellence in the Drainage and facility of making Repairs.

The above cut represents the "Herron Track" as it is laid on the Philadelphia and Reading, and on the Baltimore and Susquehanna Railroads. The intersection of the sills of the trellis are 5 feet from centre to centre, while in the new construction they are only 2½ feet. This renders the string piece unnecessary, thus removing the only objectionable feature found in the Track.

The result of experience has proved that all Tracks constructed with longitudinal timbers, such as mud sills, and more especially, the continuous bearing string pieces retain the rain water that falls between the Rails, which, being thus confined, settles along those timbers, and accumulating in quantity flows rapidly along them on the descending grades, washing out the earth from under the timber, and frequently causing large breaches in the embankments of the road. Whereas all water intercepted by the oblique sills of the trellis, is discharged immediately into the side ditches.

In the 5 foot plan, the Track occupies a Road bed nearly 11 feet wide, while the new construction takes

but 8 feet; the timber being more concentrated under the Rails. A block of hard wood, about 2 feet long and 15 inches wide, is introduced into a square of the trellis for the purpose of giving an additional, and effectual support to the joints of the Rails, which rest upon it. Should these joint blocks become chafed and worn by the working, and imbedding of the chairs, as is now the case on all Railroads, they can be readily replaced without any derangement of the timbers less liable to wear.

The following is a general estimate of its cost near the seaboard. In the interior it will be considerably less.

## ESTIMATE OF THE PROBABLE COST OF ONE MILE.

4,224 Timbers, 11 ft. long, 3 x 6 inches =	
68,696 ft. b.m., at \$10 =	\$686 96
587 Oak joint blocks 2 ft. x 3 x 15 in. =	
4,403 ft. b.m., at \$13 =	57 24
13,000 Spikes = 2,250 lbs. at 4½ cts. =	101 25
Workmanship free of patent charge =	600 00

Cost of one mile including the laying of the Rail.....\$1,445 45

He has made other important improvements, which will be shown in properly proportioned models, that give a much better idea of the great strength of the Track than a drawing will do.

Sales of the Patent right to all the distant States will be made on liberal terms.

JAMES HERRON.

Civil Engineer and Patentee.

No. 277 South Tenth St., Philadelphia. 334f

**ENGLISH PATENT WIRE ROPES—FOR THE USE OF MINES, RAILWAYS, ETC.—**

for sale or imported to order by the subscriber. These Ropes are manufactured on an entirely different principle from any other, and are now almost exclusively used in the collieries and on the railways in Great Britain, where they are considered to be greatly superior to hempen ones, or iron chains, as regards safety, durability and economy. The plan upon which they are made effectually secures them from corrosion in the interior, as well as the exterior of the rope, and gives a greater compactness and elasticity than is found in any other manufacture.

Many of these ropes have been in constant operation in the different mines in England, and on the Blackwall and other inclined planes, for three and four years, and are still in good condition.

They have been applied to almost every purpose for which hempen ropes have been used—mines, heavy cranes, standing rigging, window cords, lightning conductors, signal halyards, tiller ropes, etc. Reference is made to the annexed statement for the relative strength and size. Testimonials from the most eminent engineers in England can be shown as to their efficiency, and any additional information required respecting the different descriptions and application will be given by

ALFRED L. KEMP,

75 Broad street, New York, sole agent in the United States.

Statement of Trial made at the Woolwich Royal Dock Yard, of the Patent Wire Ropes, as compared with Hempen Ropes and Iron Chains of the same strength.—October, 1841.

WIRE ROPES.			HEMPEN ROPES.			CHAINS.		STRENGTH Tons.
Wire gauge number.	Circumference of rope.	Weight per fathom.	Circumference of rope.	Weight per fathom.		Weight per fathom.	Diameter of iron.	
	INCH.	LBS. OZ.	INCH.	LBS. OZ.		LBS.	INCH.	
11	4½	12 5	10	21 -	50	15-16		20
13	3½	8 3	8½	16 -	27	11-16		13½
14	3¼	6 11	7½	12 8	17	9-16		10½
15	2½	5 2	6½	9 4	13½	1-2		7½
16	2¼	4 3	6	8 8	10½	7-16		7

N.B. The working load, with a perpendicular lift, may be taken at 6 cwt. for every lb. weight per fathom, so that a rope weighing 5 lbs. per fathom would safely lift 3360 lbs., and so on in proportion. 1y24

ENGINEERS' AND SURVEYERS'  
INSTRUMENTS MADE BY  
EDMUND DRAPER,  
Surviving partner of  
STANCLIFFE & DRAPER.



No 23 Pear street,  
1y10 near Third, below Walnut,  
Philadelphia.

LAP—WELDED  
WROUGHT IRON TUBES

FOR

## TUBULAR BOILERS,

FROM 1 1-4 TO 6 INCHES DIAMETER,

and

ANY LENGTH, NOT EXCEEDING 17 FEET.

These Tubes are of the same quality and manufacture as those so extensively used in England, Scotland, France and Germany, for Locomotive, Marine and other Steam Engine Boilers.

THOMAS PROSSER,

Patentee.

1y25

28 Platt street, New York.

## ENGINEERS and MACHINISTS.

THOMAS PROSSER, 28 Platt St. N. Y. (See Adv.)

J. F. WINSLOW, Albany Iron and Nail Works Troy, N. Y. (See Adv.)

TROY IRON AND NAIL FACTORY, H. Burden, Agent. (See Adv.)

ROGERS, KETCHUM &amp; GROSVENOR, Paterson, N. J. (See Adv.)

S. VAIL, Speedwell Iron Works, near Morristown, N. J. (See Adv.)

NORRIS, BROTHERS, Philadelphia Pa. (See Adv.)

FRENCH &amp; BAIRD, Philadelphia. (See Adv.)

NEWCASTLE MANUFACTURING COMPANY, Newcastle, Del. (See Adv.)

ROSS WINANS, Baltimore, Md.

CYRUS ALGER &amp; Co., South Boston Iron Co.

SETH ADAMS, Engineer, South Boston.

STILLMAN, ALLEN &amp; Co., N. Y.

JAS. P. ALLAIRE, N. Y.

PHOENIX FOUNDRY, N. Y.

ANDREW MENEELY, West Troy.

JOHN F. STARR, Philadelphia, Pa.

MERRICK &amp; TOWNE, do.

HINCKLEY &amp; DRURY, Boston.

C. C. ALGER, Stockbridge Iron Works Stockbridge, Mass.

## THE AMERICAN RAILROAD JOURNAL

is the only periodical having a general circulation throughout the Union, in which all matters connected with public works can be brought to the notice of all persons in any way interested in these undertakings. Hence it offers peculiar advantages for advertising times of departure, rates of fare and freight, improvements in machinery, materials, as iron, timber, stone, cement, etc. It is also the best medium for advertising contracts, and placing the merits of new undertakings fairly before the public.

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